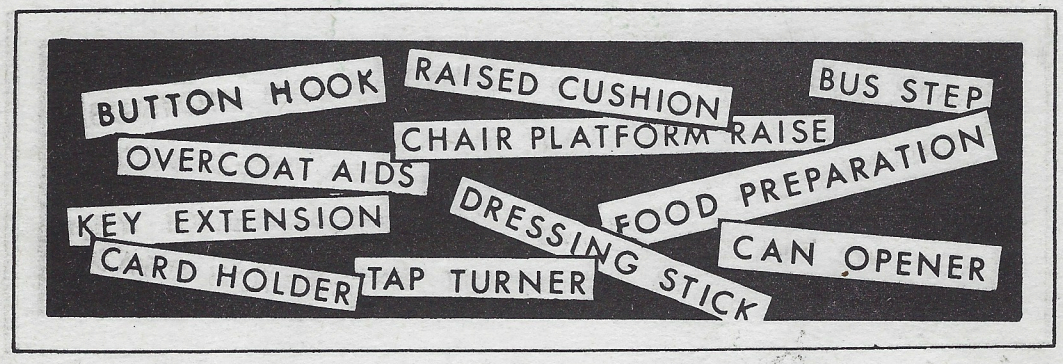
AIDS AND ADAPTATIONS

A COLLECTION OF DESIGNS COMPILED BY

The Occupational Therapy Department
THE CANADIAN ARTHRITIS AND RHEUMATISM SOCIETY
British Columbia Division, Vancouver, B. C.



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Technology Resource Center

FOREWORD

It is a pleasure indeed to write a foreword to this Manual. It records one of the growing contributions of the profession of Occupational Therapy to the field of rehabilitation.

The adaptive and self help aids, so beautifully drawn and in many cases devised or modified by Miss MacBain and her staff in their work with arthritis patients, have been supplemented by clear instructions so that usually the handyman or handy husband can construct them without difficulty. These prototype devices have, of course, application in a broad field of disability.

As a physician working closely with the disabled rheumatic patient, I might be allowed to insert a word of caution. As a generalization it might be stated that self care aids should be kept to a minimum. The aid or adaptive device should be prescribed only with a definite goal in mind and after careful evaluation. They should complement rather than be a substitute for a well planned rehabilitation program lest they foster disability.

On the other hand many of the home adaptations, such as furniture raises, have a preventative role as well as a functional goal in relieving stress on joints compromised by disease. They therefore have a wide application in practical management.

I am sure that the Manual will find a useful place in the therapeutic armamentarium of those interested in the rehabilitation of disabled individuals.

H. S. Robinson, M.D.
Medical Director, B. C. Division,
The Canadian Arthritis and Rheumatism Society

INTRODUCTION

The items described in this pamphlet have been used successfully by patients seen in the Occupational Therapy Department of The Canadian Arthritis and Rheumatism Society, British Columbia Division. Many are not new. The pamphlet is meant to be an illustrative guide and a catalyst for ideas. As any occupational therapist knows, there are few standard patients and few standard answers. Innovation is the order, and effectiveness the goal.

PART I - SELF HELP AIDS

This section is devoted to simple aids designed to compensate for loss of strength, range of motion or dexterity in activities of daily living. Most have no commercial equivalent. If they do, expense is often prohibitive.

PART II - ENVIRONMENTAL ADAPTATIONS

These are modifications of standard furniture, suggestions for custom design and structural alterations. They are designed to relieve stress on weight bearing joints, or to facilitate independent functioning.

Grateful acknowledgement is made to past and present patients, staff and students, who have all contributed to this collection.

K. Patricia MacBain, O.T. Reg.
Research/Education Co-ordinator
for Occupational Therapy
British Columbia Division

NOTES ON SECOND EDITION

In this updated edition of Aids and Adaptations, there are 19 additional items and a few altered originals. The basic intent remains the same - to provide suggestions for inexpensive aids for people with arthritis.

The philosophical emphasis in the self-help section has shifted from compensating for loss of physical capacities to minimizing stress. Damage to diseased joints is compounded by functional use, which may amount to abuse, and an aid which will relieve deformity-producing pressures is an important treatment tool.

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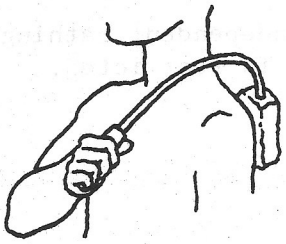
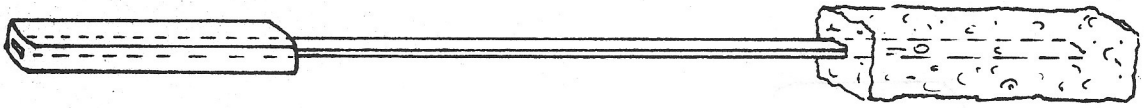
SELF-HELP AIDS

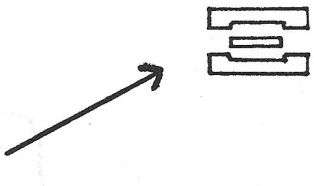
LONG-HANDLED SPONGE



PURPOSE:

To aid in washing back and wherever hands cannot reach when range is restricted.





CONSTRUCTION:

1. Cut groove for aluminum in wood, and glue together for handle.
2. Smooth other end of aluminum so it won't cut sponge.
3. Split sponge lengthwise and glue onto aluminum with waterproof glue.
   End of aluminum should be in 1" from end of sponge.

MATERIALS:

2 of 4" lengths of 3/8" x 1" wood.

½" x 1/8" soft aluminum 50 ST 6 in length desired, e.g. 18", 24".

2" x 3" x 5" sponge (if sponge is too big it weighs too much when saturated.

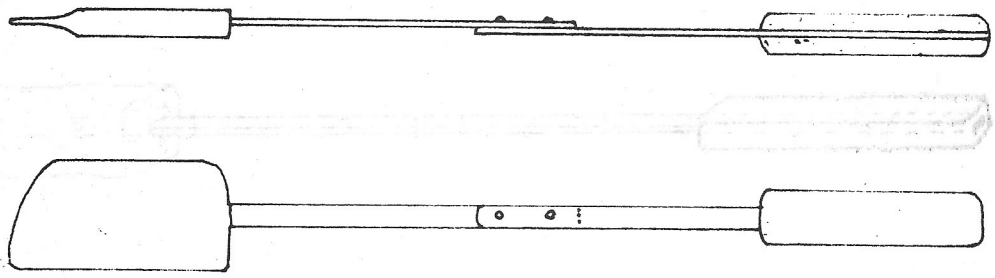
ALTERNATIVE:

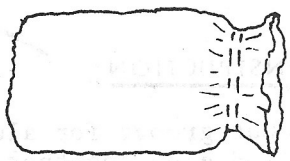
½" high density polyethylene rod can be substituted for the aluminum; Rubazote can be slipped over the end for a handle.

LONG-HANDLED TOE WASHER & DRIER

PURPOSE:

To allow independent bathing of feet when reach is restricted.





terry toweling
slip-cover

MATERIALS:

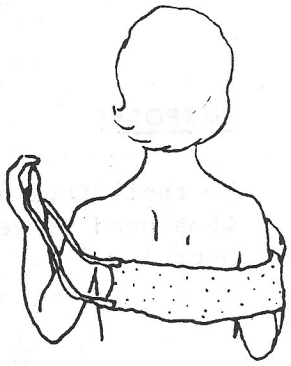
1 rubber or plastic bowl scraper or facsimile.

1 piece of aluminum (65 ST 6 bar) or equivalent, to lengthen scraper.

2 pieces of wood, 3/8" x 1" x 4" for handle.

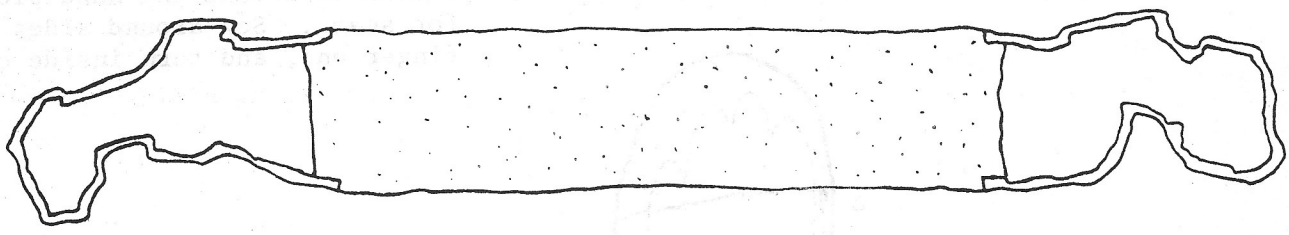
2 pieces of terry toweling 5" x 5" for slip-covers, (1 for washing, 1 for drying), with elastic or velcro around top.

SLING TOWEL



PURPOSE:

To enable drying of back and other parts of body when limited reach prohibits.



MATERIALS:

36" x 18" terry toweling

2 pieces of 22" x ½" nylon tape

CONSTRUCTION:

1. Fold terry toweling lengthwise.
2. Stitch around 3 edges; turn inside out and stitch remaining end with edges turned under.
3. Attach tapes securely to ends, as shown.

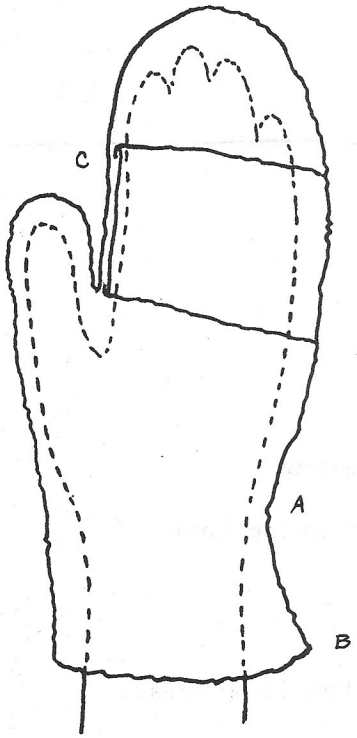
WASH MITT

PURPOSE:

To facilitate holding the washcloth, when hand is weak or co-ordination poor

MATERIALS:

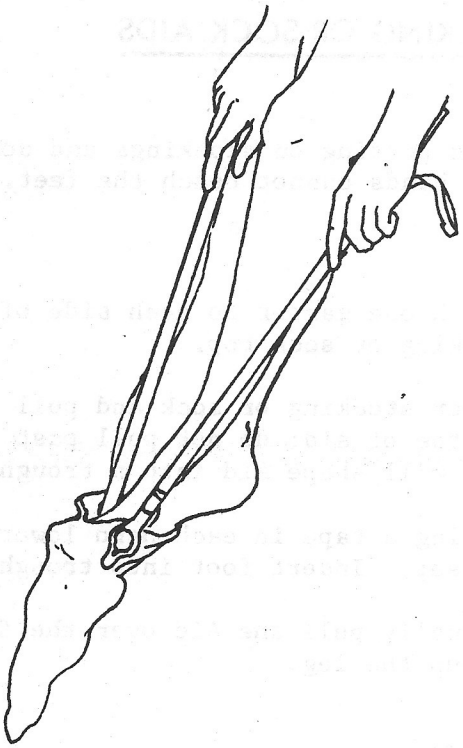
Two pieces of terry toweling, cut to appropriate size and shape for hand. To make pattern, trace around hand. Scoop in a little at the wrist (A) so it will not fall off too easily, and flare at opening (B) for ease of putting on. Allow ½" clearance around the hand plus ½" for seams. Sew around sides and finger end, and turn inside out.



A pocket for soap may be sewn on if desired; leave an opening (C) toward the thumb.

The terry toweling, when saturated, may be too heavy. A lighter material may be preferable. Also slits in the material may allow the water to drain out faster.

SOCK STICKS



PURPOSE:

To put on socks when feet cannot be reached with hands.

LIMITATIONS:

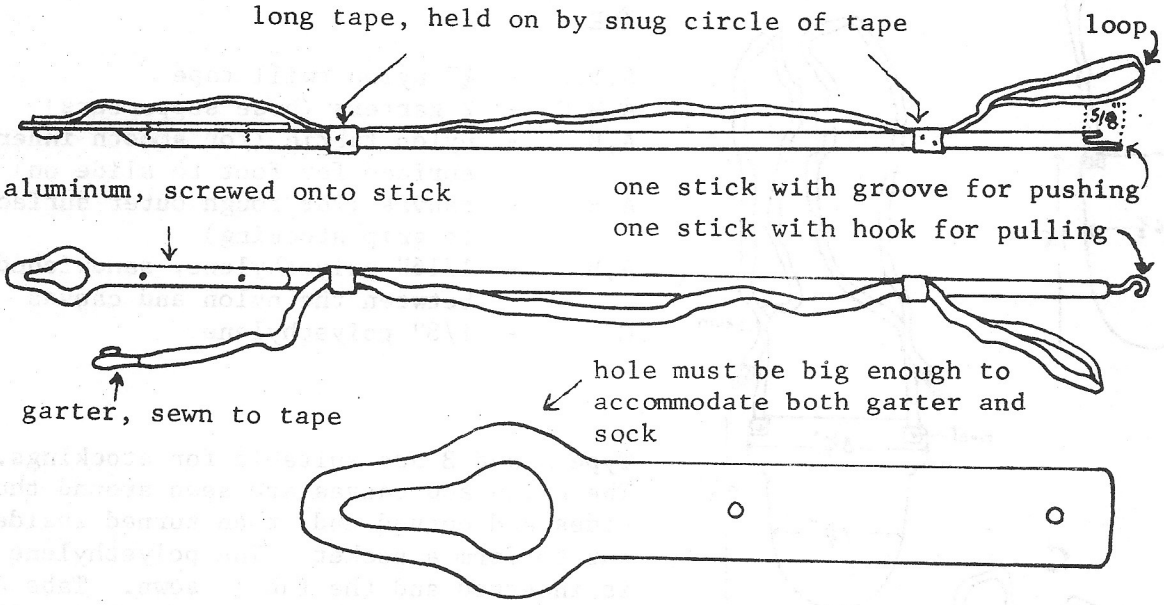
Good ankle range is necessary to use these satisfactorily.

METHOD:

Attach a stick to each side of sock opening. Lower to foot and pull sock on. Release garters by pulling tape loops.

ALTERNATIVE:

Tape loops may be sewn inside sock close to heel, and may be used with hooks of dressing sticks.


long tape, held on by snug circle of tape
loop
5/8"
aluminum, screwed onto stick
one stick with groove for pushing
one stick with hook for pulling
garter, sewn to tape
hole must be big enough to accommodate both garter and sock

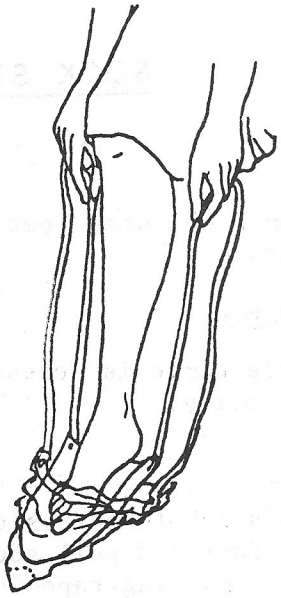
MATERIALS: (for 1 pair)

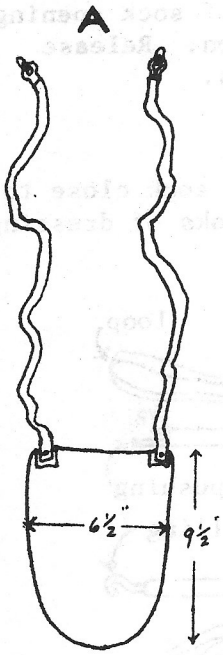
2 of ½" x ½" wood, of length desired (e.g. 18", 27")

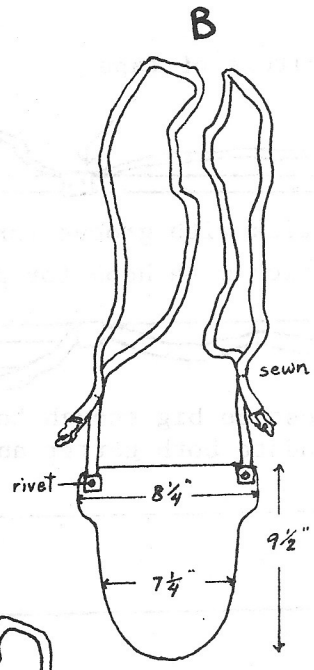
2 aluminum attachments (see above pattern) made from 65 ST 6 .064 (14 ga.) sheet aluminum, i.e. firm aluminum that will stand up to pressure.

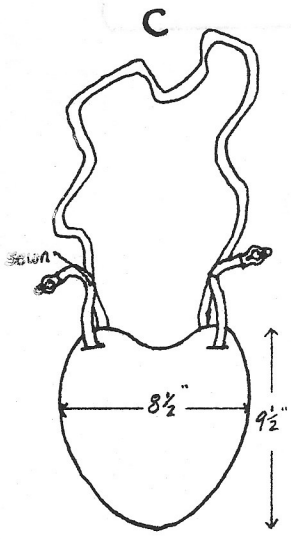
2 garters (hose attachments) metal and cloth type is better than plastic, as it has a deeper neck and will accommodate thicker material.

STOCKING OR SOCK AIDS









PURPOSE:

To aid in putting on stockings and socks when the hands cannot reach the feet.

METHOD:

1. Attach one garter to each side of stocking or sock top.

2. Gather stocking or sock and pull over the toe of Aid; do not pull past end. This will shape Aid into a trough.

3. Holding a tape in each hand lower Aid to feet. Insert foot into trough.

4. Gradually pull the Aid over the foot and up the leg.

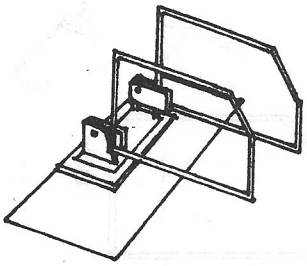
MATERIALS:

For

A,B,C	-	½" nylon twill tape
A,B,C	-	2 garters (hose supporters)
A,B	-	nylon fabric (for smooth inner surface for foot to slide on)
A,B	-	canvas (for rough outer surface to grip stocking)
A,B	-	1/16" polyethylene, sandwiched between the nylon and canvas
C	-	1/8" polyethylene

Type A and B are suitable for stockings. The nylon and canvas are sewn around the sides and curved end, then turned inside out to form a pocket. The polyethylene is inserted and the fabric sewn. Tabs of leatherette between rivet and fabric will deter tearing.

Type C, being more rigid, is appropriate for socks. Garters may not be needed.

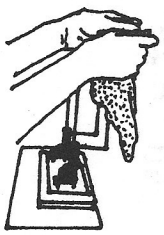


HINGED SOCK AID – page 1

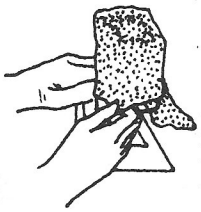
PURPOSE:

To aid dressing when feet and ankles have little or no motion or are painful. It is collapsible.

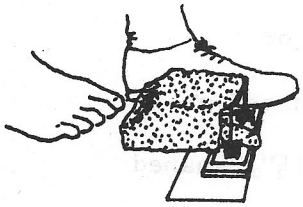
METHOD:

1. 

Flip hinges up. Hold sock upright between the frames with toe forwards.

2. 

Pull top edge of sock down over frames until heel is reached. Do not pull the sock over the lower angle of the frame. (Leg portion of the sock is now inside out).

3. 

Return aid to horizontal position, and lower to the floor. (The method used will depend on the patient; a cord or a rigid handle may be appropriate.) Stabilize aid with the other foot.

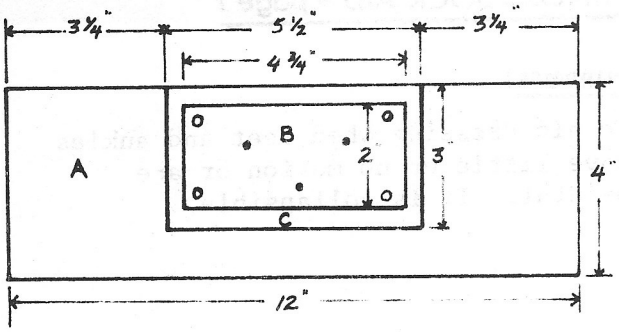
4.

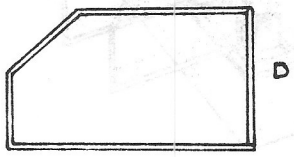
Push foot in until the toe reaches the end of sock

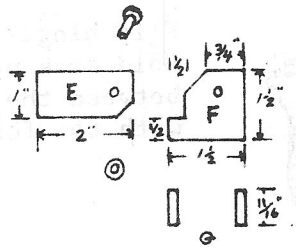
5.

To clear heel, gently lift foot upwards, allowing the aid to hinge. Ease foot forward and down. To finish, thrust foot forward and up.

(See over for construction details...)







MATERIALS:

Base:

A - 12" x 4" of 16 gauge aluminum
B - 4 3/4" x 2" of 16 gauge aluminum
C - 5½" x 3" of 3/8" plywood
- 6 small 3/8" countersunk screws

Sides:

D - 36" of 3/32" diameter spring steel
- 4" x 2½" of 1/8" mild or stainless steel:
E - for 2 arms 2" x 1", shaped as shown
F - for 2 uprights 1½" x 1½", shaped as shown
G - 5½" of ¼" round mild steel rod
2 of ¼" round headed 3/8" long rivets
2 of ¼" stainless steel washers

CONSTRUCTION:

Base:

Cut the pieces to size; screw long piece of aluminum A to the plywood as shown.

Screw smaller piece B on top of plywood.

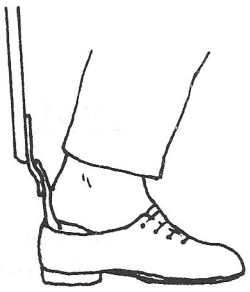
Sides:

Heat the 3/32" spring steel D and bend to shape.
Cut arms E and uprights F out of the 1/8" sheet steel and file to shape. Solder the frame to each arm.

To make the hinge, drill ¼" holes in the arms and uprights; countersink the holes in uprights. Lightly hammer the rivets and washers in place.

Cut 4 pins G from the ¼" round; braze onto the uprights 1" apart.

Drill holes in base for pins from each side assembly; the spacing between sides will depend on size of foot.

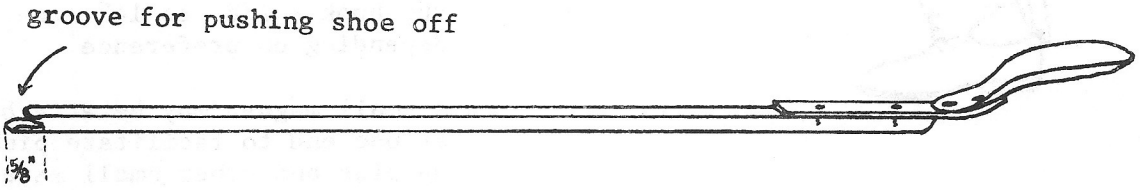


LONG SHOE HORN

PURPOSE:

To aid in slipping on shoes when reach is limited. May be used in conjunction with elastic or zipper shoe laces.

When stabilizing the shoe is desired, two shoe horns may be used together.



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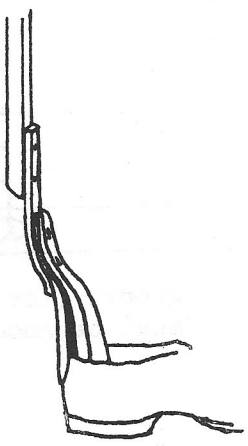


MATERIALS:

½" x ½" wood of desired length, e.g. 18", 24", 30".

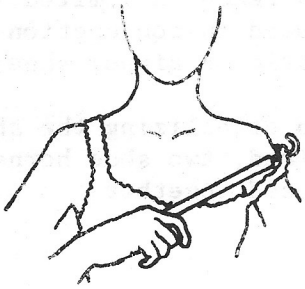
Metal shoe horn (2 for double type).

5" x ½" x 1/8" firm aluminum 65 ST 6 (to support shoe horn).

CONSTRUCTION:

1. Bend one end of aluminum to contour of shoe horn and rivet together. If using two shoe horns, separate with washers so shoe will fit between other ends.
2. Screw aluminum to wood.
3. Sand grooved end of wood smoothly so it will not snag socks.

DRESSING STICK



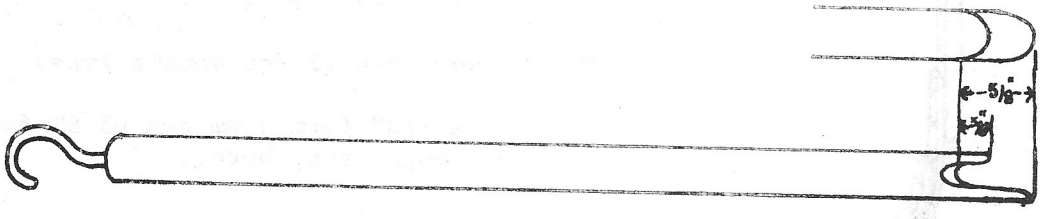
PURPOSE:

To aid in pulling on or pushing off clothing when range is restricted.

Also useful in maneuvering object beyond reach, e.g. light switch, cups on hooks.

MATERIALS:

- ½" x ½" wood of desired length (e.g. 15", 21")
- cup hook - 7/8" to 1½" size depending on preference.
- a small magnet may be attached at one end to facilitate picking up pins and other small metal objects.



groove (for pushing) must be smoothly rounded

ALTERNATIVES:

A wire clothes hanger, pulled into a long loop, makes a versatile aid.

BOOT JACK

PURPOSE:

To assist in removing boots or shoes when strength or range is limited.

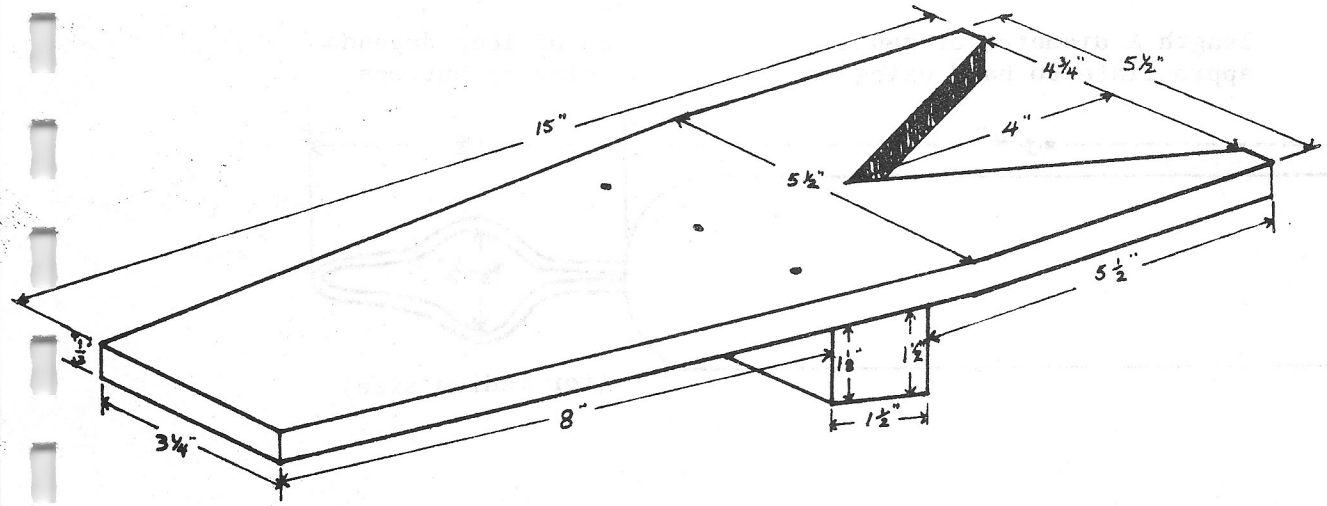
MATERIALS:

A - 1 platform; 15" x 3¼" plywood — 5½" x ½"

B - 1 support; 5" x 1 1/8" wood — 1½" x 1½"

- 3 screws

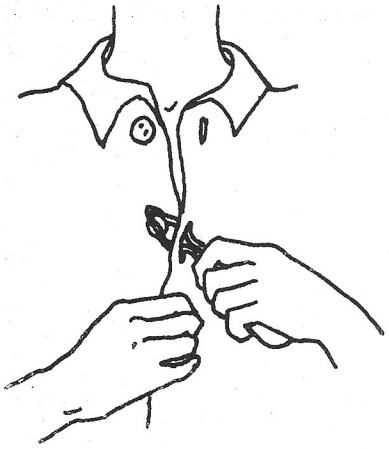
- heavy rubber lining for notch

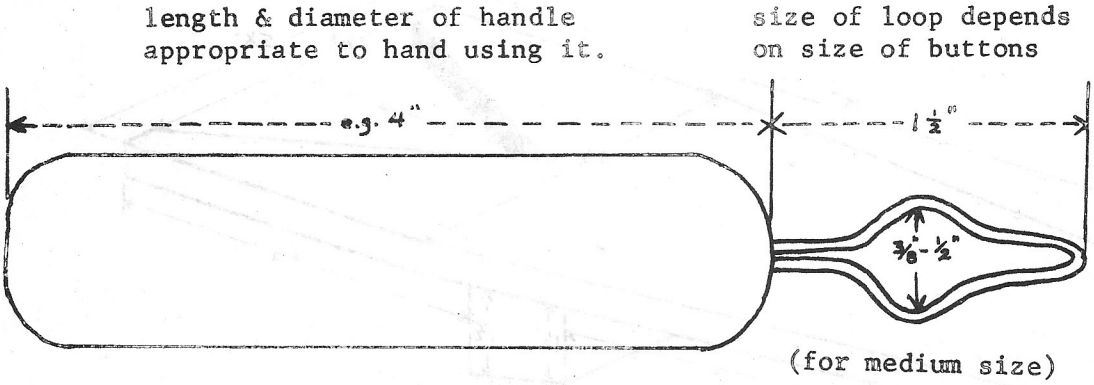


BUTTON HOOK

PURPOSE:

To facilitate buttoning when dexterity and reach are poor.





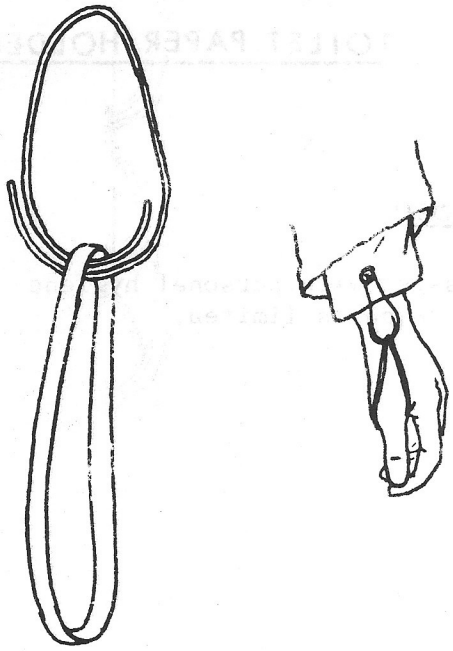
(for medium size)

MATERIALS:

Firm wire, embedded in handle; should be fine wire.

Handle, of wood dowell, plastic, or other material.

OVERCOAT AIDS



A. SLEEVE ANCHOR:

PURPOSE:

To keep jacket sleeve from crawling up when pushing arm into overcoat. It avoids having to grip the edge of the sleeve.

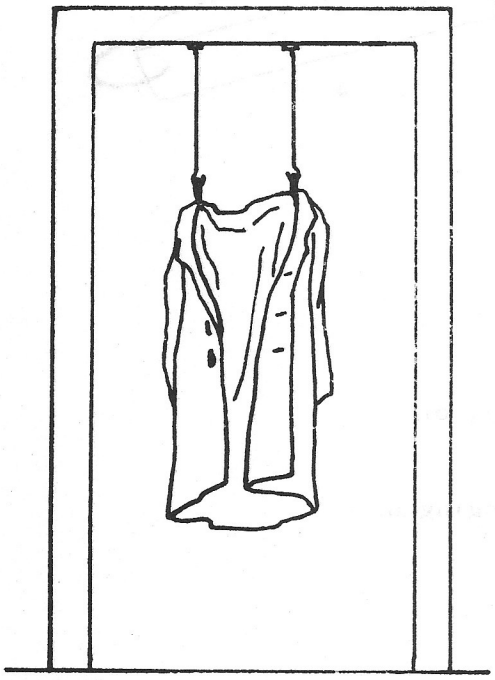
MATERIALS:

A rubber band, attached to a wire loop (e.g. re-bent paper clip), big enough to fit over jacket button.

METHOD:

With jacket on, hook loop over button, then slip elastic over thumb before putting arm into overcoat. Carry in pocket so it is handy when needed.

B. OVERCOAT HANGER:



PURPOSE:

To support the overcoat so that shoulders are relieved of the weight when putting it on.

MATERIALS:

Two strong staples are fastened to the top of a door frame, a shoulders' breadth apart. (Rings on a clothes closet rod will also work.)

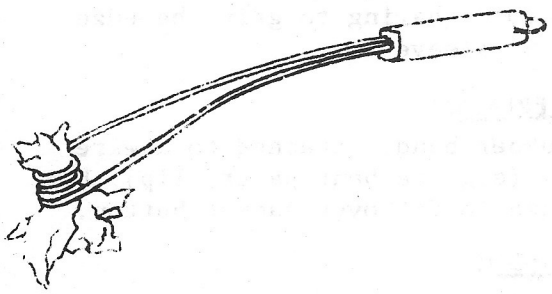
A strong cord is attached to each, with a strong hook at the end.

Loops made of shoe-laces are sewn inside the coat, under the lapel so as to be invisible from the outside.

METHOD:

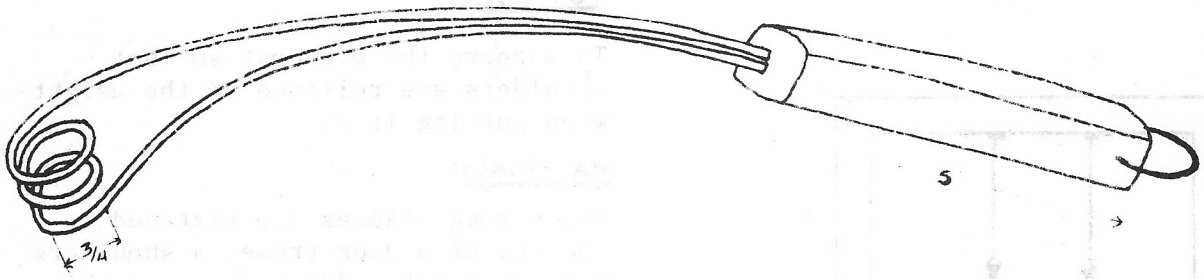
Hang coat on hooks so that it is at shoulder level - back into it, pushing arms into sleeves. Undo hooks.

TOILET PAPER HOLDER



PURPOSE:

To assist with personal hygiene when reach is limited.



MATERIALS:

- Coat hanger wire (or equivalent), of appropriate length.
- Wooden handle, with loop for hanging up.

LONG-HANDLED COMB or BRUSH

PURPOSE:

To aid in combing or brushing hair when range is restricted.

MATERIALS:

2 of 4" lengths of 3/8" x 1" wood.
½" x 1/8" soft aluminum 50 ST 6
in length desired, e.g. 15", 18"
1 rat-tailed comb.
2 rivets.

CONSTRUCTION:

Cut groove for aluminum in wood, and glue together for handle.

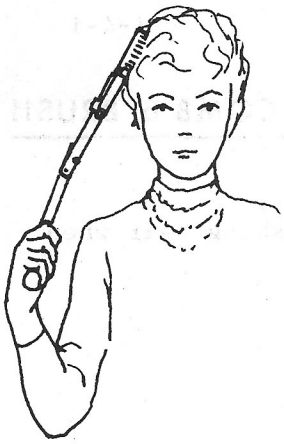
Cut comb handle, leaving 2" for attachment.

Carefully drill 2 holes into comb handle, and into aluminum; rivet together.

Bend aluminum to convenient angle.

ALTERNATIVES:

If plexiglass tubing is available, it makes a light-weight, unobtrusive handle. Soften one end over heat, wedge comb handle into it and clamp firmly with pliers to produce a snug fit. It may need reinforcement with a rivet. Heat and bend plexiglass handle to convenient angle.



COLLAPSIBLE LONG-HANDED BRUSH-COMB

PURPOSE

To aid grooming when range is restricted.

MATERIALS:

A - 1 extension; aluminum bar 9½" x 5/8" x 1/8" soft

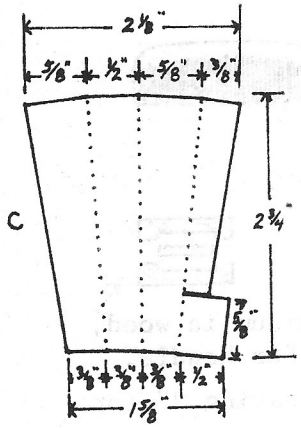
B - 1 extension; aluminum bar 6" x 5/8" x 1/8" soft

C - 1 pocket; aluminum sheet 2 1/8" x 2 3/4" x 14" gauge (.064) soft

D - 2 handle pieces; wood 4" x 5/8" x 1/4"

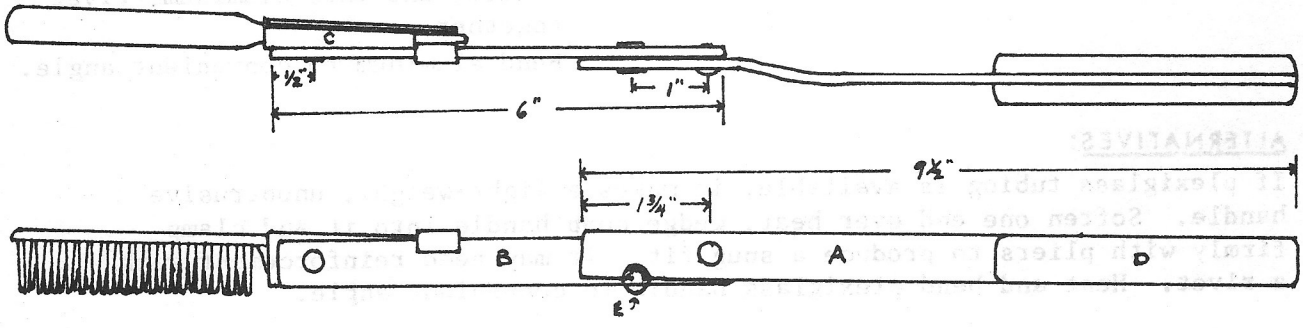
E - 1 speedy rivet, #4

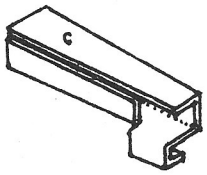
F - 2 rivets; aluminum

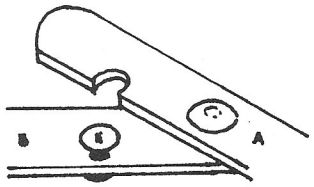


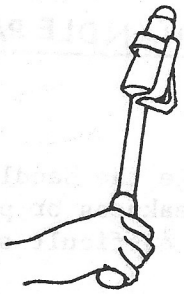
CONSTRUCTION:

Cut and bend sheet aluminum C. Rivet it to bar B so that it will swivel until flange hooks over edge. Drill hole in B for speedy rivet E with centre 1/8" in from edge. Hammer in rivet so that it has a 1/8" gap between cap and bar; it should slide up and down in hole. Cut notch in bar A to match rivet E; rivet A onto B so that the notch locks into E when bar is swivelled. Wedge comb into the pocket formed by C.









DEODORANT HOLDER

PURPOSE:

To extend reach when upper extremity motion is restricted.

MATERIALS:

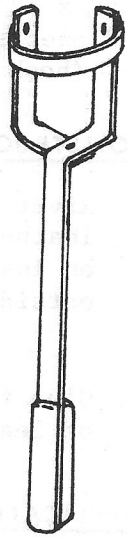
A - 1 extension; aluminum 10" x ½" x 1/8" soft bar

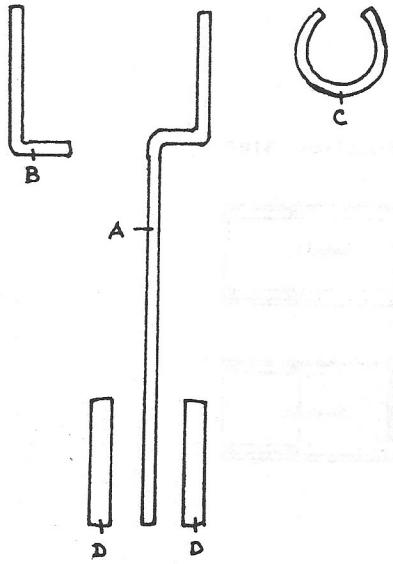
B - 1 side support; aluminum 4" x ½" x 1/8" soft bar

C - 1 top support; aluminum 3½" x ½" x 1/8" soft bar

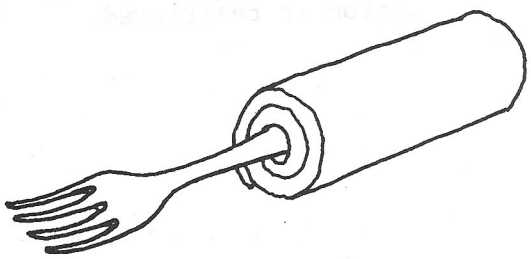
D - 2 handle pieces; wood 4" x ½" x 3/8"

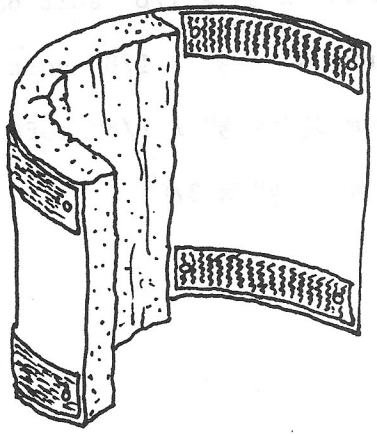
- 3 rivets



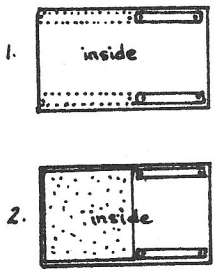


HANDLE PADDING





construction steps



PURPOSE:

To enlarge the handle when limited range, weakness or pain makes gripping difficult or uncomfortable.

Padding may be attached to eating or cooking utensils, tools, crutches, canes, or any other type of handle.

A. DETACHABLE: (Pictured)

This type may be transferred from one object to another, or may be removed for washing utensil. When firm padding is needed, this type may be difficult to attach snuggly if hand is weak.

MATERIALS:

(size may be altered to suit need)

4" x 4" of ½" foam rubber
4" x 7" of leatherette
2 pieces of velcro, 3" long, (hook & pile)

CONSTRUCTION:

1. Rivet or sew velcro onto leatherette, so that hook is on inside and pile is on outside.

2. Glue foam rubber onto inside of leatherette.

APPLICATION:

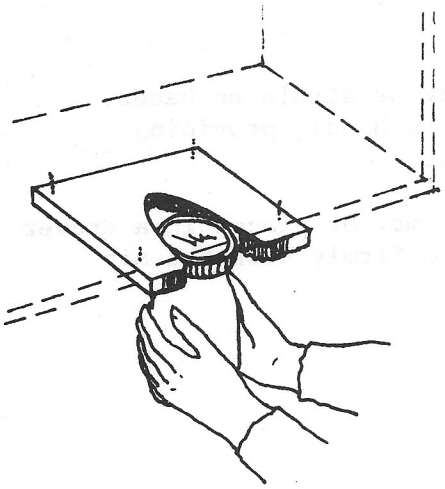
Place utensil at edge of foam rubber and roll padding around it tightly.

B. ALTERNATIVES:

1. Foam rubber wrapped around handle and covered with adhesive tape makes a quick, comfortable enlarged handle. Fresh tape may be put on when original is soiled.

2. Wood dowel, bicycle handle grips, rubber hose, are other possibilities.

JAR OPENER



PURPOSE:

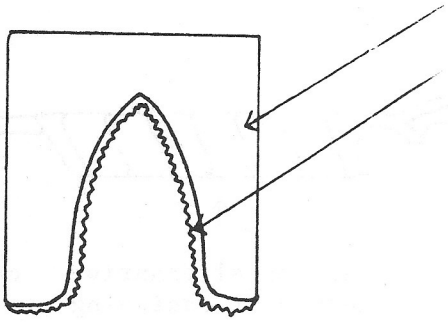
To help turn jar lids when grip is weak or painful.

METHOD:

Attach opener under a cupboard, close to edge.

Wedge jar into slot and rotate with both hands.

MATERIALS:



1" thick wood

1" wide textured rubber, glued and nailed, (e.g. inner tube rubber, slashed so as to give traction).

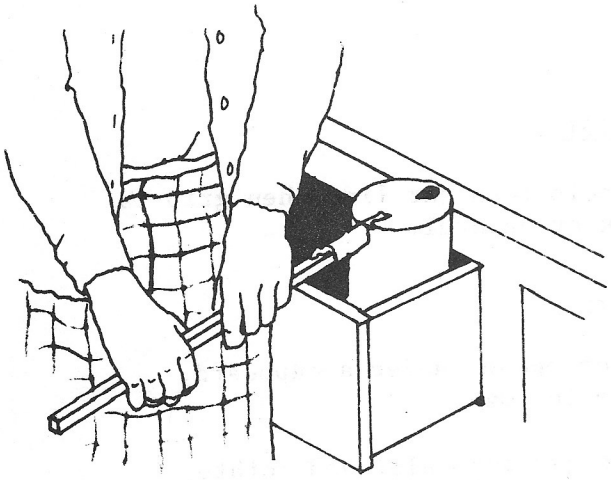
OR:

Old hack-saw blade inserted into left side of wood, to grip lids; emery paper on other side.

ALTERNATIVES:

1. Square of textured sheet rubber (also useful for door handles).
2. Commercial types which avoid stress on joints of fingers.

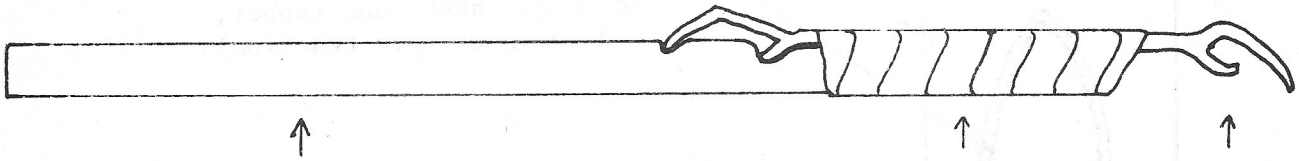
CAN OPENER



PURPOSE:

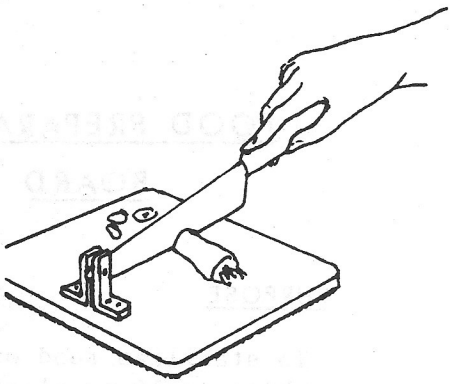
To decrease strain on hands, with long handle providing leverage.

The can may be placed in a drawer and held firmly with the hip.



NOTE:

The principle of leverage may be applied to many household tasks.



CHOPPING BOARD

PURPOSE:

To relieve stress on hand and to compensate for weakness.

MATERIALS:

A - 1 knife (if too high a grade of steel, it will be difficult to drill a hole in it)

B - 1 base; plywood, covered with arborite; 9" x 9" x ½" or size appropriate to knife

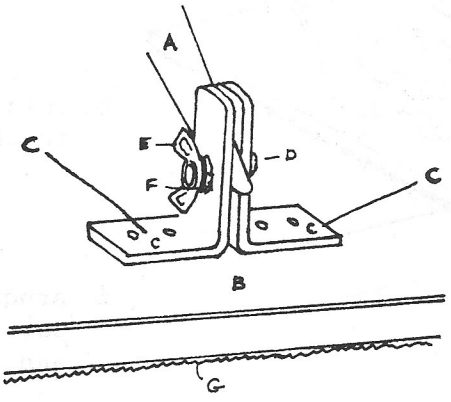
C - 2 supports; aluminum, 2" x ½" x 1/8" soft bar

D - 1 bolt; ¼" x 3/4"

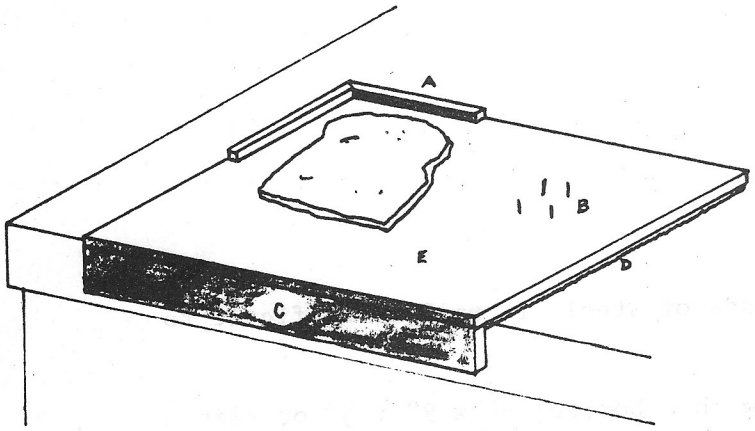
E - 1 wing nut; ¼"

F - 1 lock washer; ¼"

G - non-slip lining underneath



FOOD PREPARATION BOARD



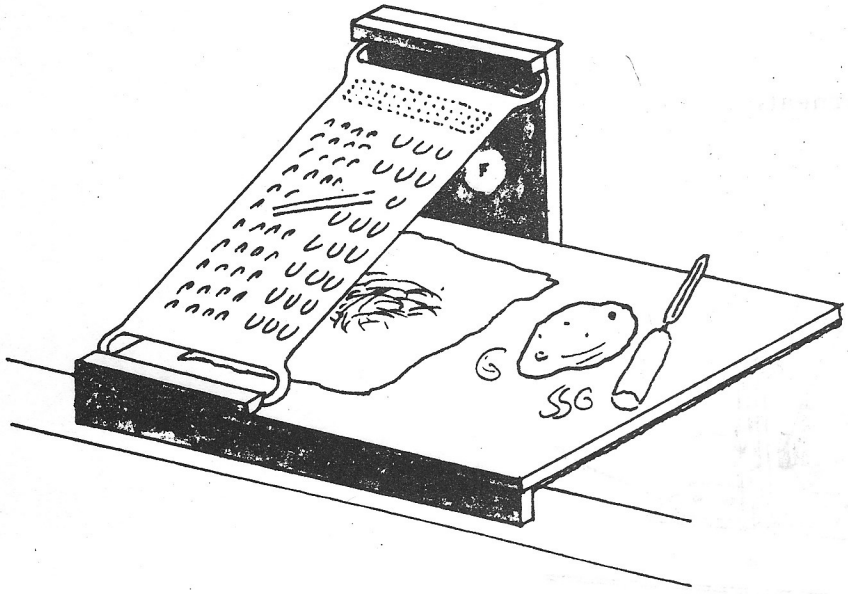
PURPOSE:

To stabilize food or utensils while peeling, slicing, buttering, etc., so that hands are relieved of static gripping.

OPTIONAL FEATURES:

A. Shallow rim (¼") at corner, to wedge bread against while buttering

B. Rust-proof nails, to anchor vegetables.

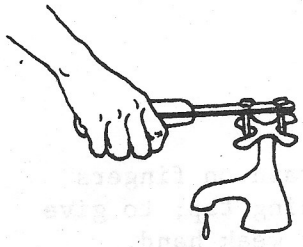


C. Projection at front, to prevent board from slipping backwards.

D Thin foam rubber underneath, to minimize slipping.

E Arborite may be used for the surface, for easy cleaning and cutting.

F. Stand, to slide a grater into when needed.



TAP TURNER

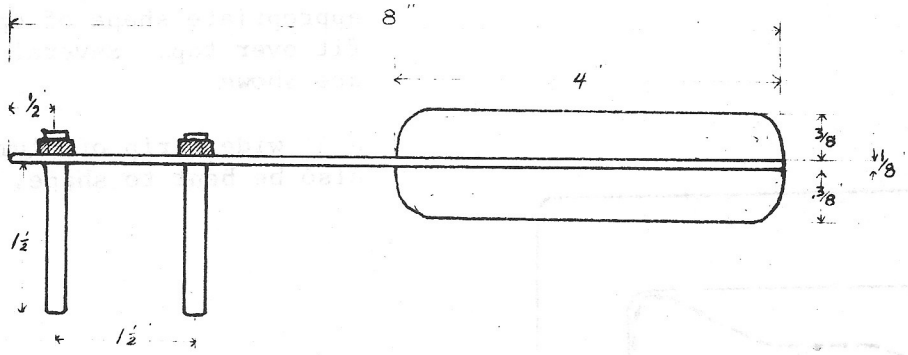
(ADJUSTABLE)

PURPOSE:

To lessen the strain on fingers and wrist in turning tap; to give leverage for weak hand.

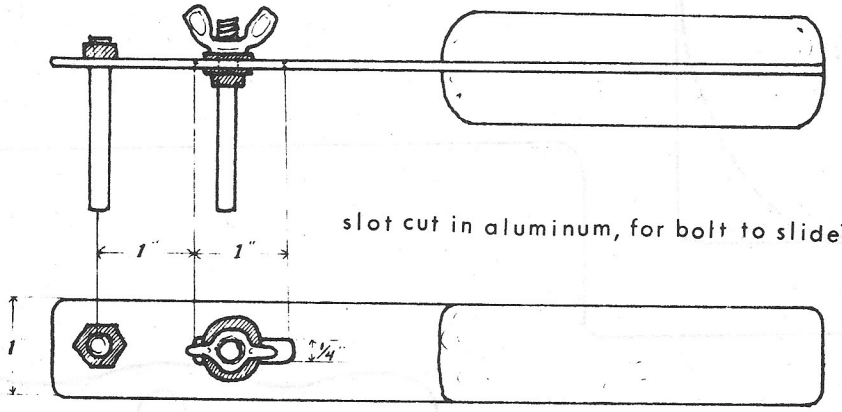
STANDARD:

Suitable for 4-pronged taps.



ADJUSTABLE:

Better for 2-pronged taps. May be fitted to tap, then tightened with pliers.



MATERIALS:

8" of 1/8" x 1" aluminum 65 ST 6 bar (firm).

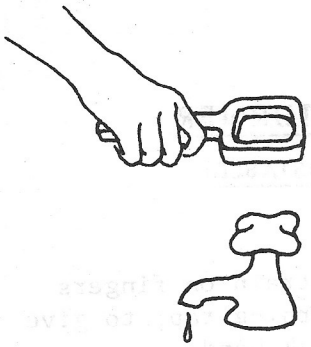
2 of ¼" x 2" carriage bolts,
(head sawn off, with only last ½" threaded;
3/4" threaded for one if for adjustable type.)

2 of ¼" nuts.

2 of 3/8" x 1" wood, 4" long.

1 of ¼" wing nut)
2 of ¼" washers) For adjustable type.

WOODEN TAP TURNER



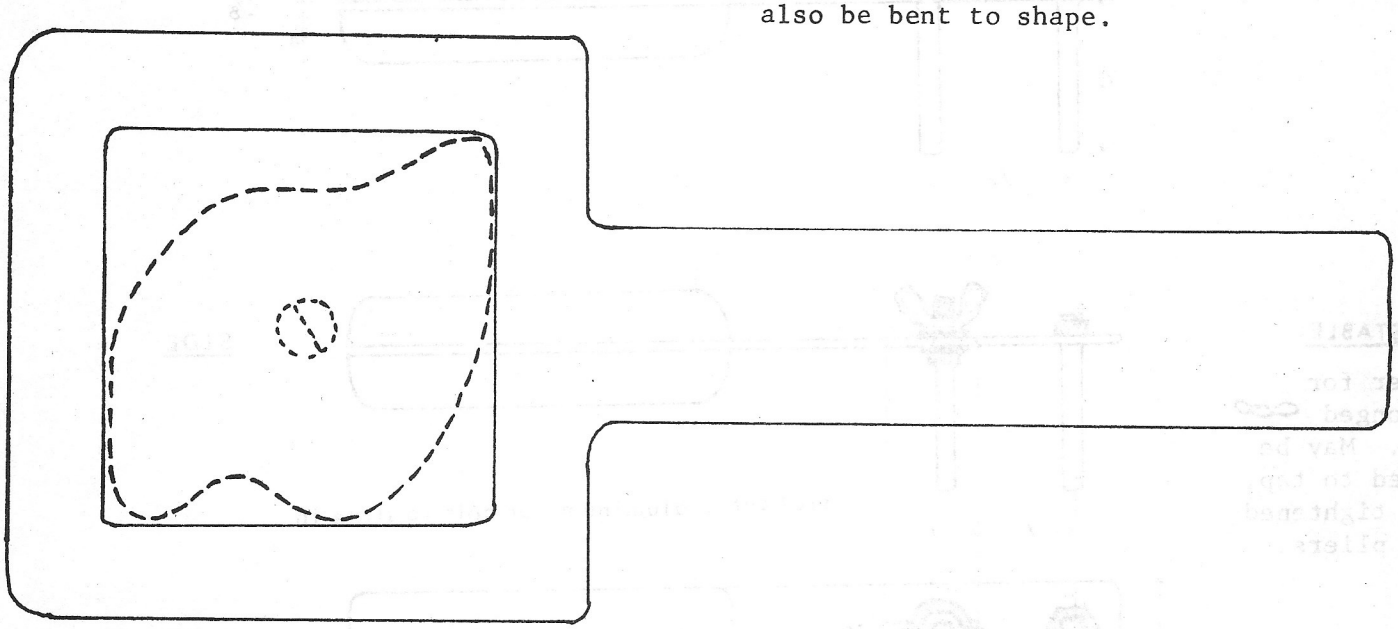
PURPOSE:

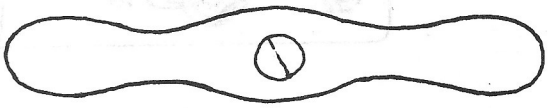
To lessen the strain on fingers and wrist in turning tap; to give more leverage for weak hand.

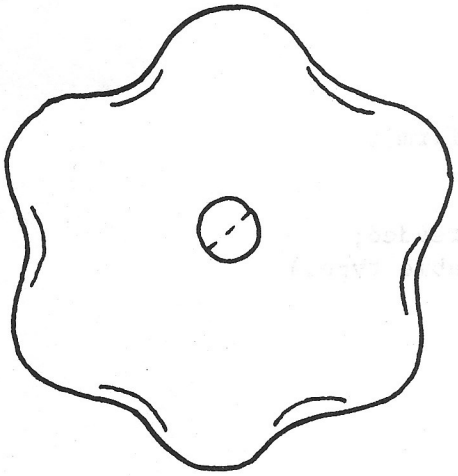
MATERIALS:

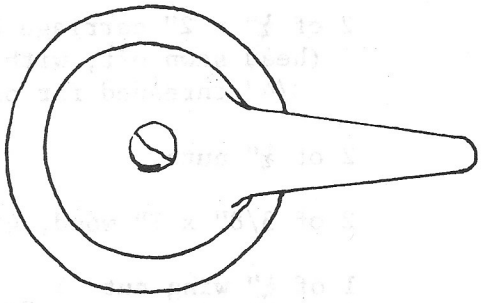
3/4" x 1" plywood, cut with appropriate shape of opening to fit over tap. Several examples are shown.

A 1" wide strip of aluminum may also be bent to shape.

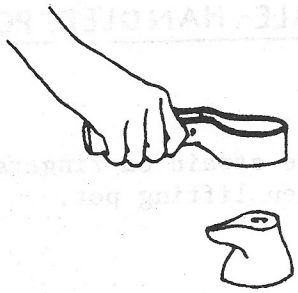






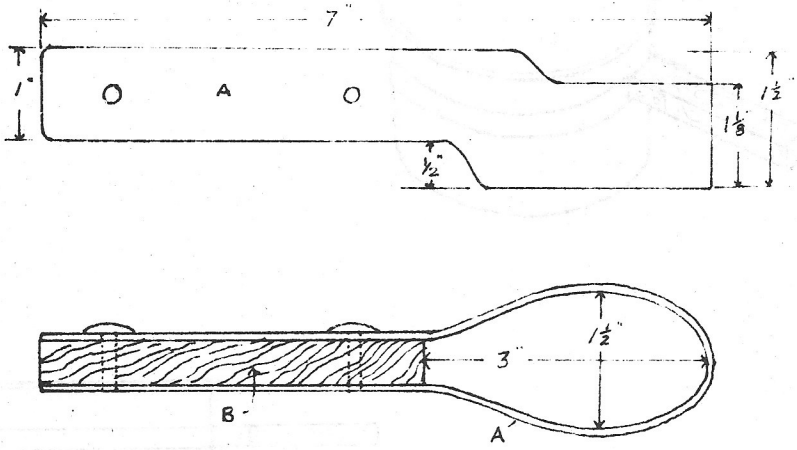


TAP TURNER – CONTOURED



PURPOSE:

To lessen the strain on fingers and wrist in turning tap; to give leverage for weak hand.



MATERIALS:

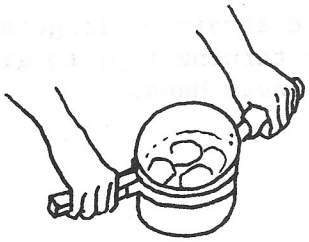
A - 1 frame; aluminum, 15½" x 1½" x 14" gauge (.064) soft sheet

B - 1 filler; wood, 4" x 1" x ½"

C - 2 rivets; aluminum 3/16" x 3/4"

- lining of non-scratch, non-slip material

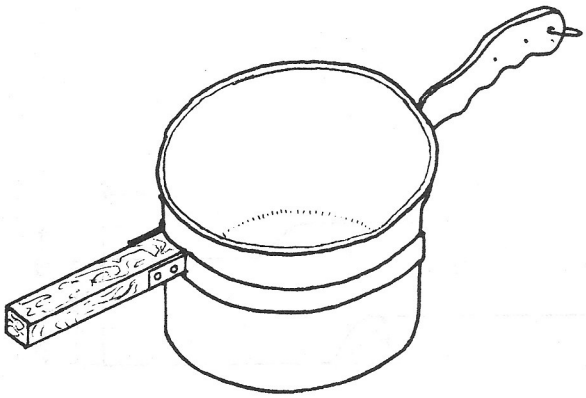
Handle may be shorter or longer depending on space or need.

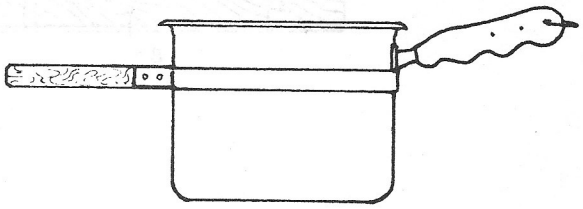


DOUBLE-HANDLED POT

PURPOSE:

To relieve strain on fingers and wrists when lifting pot.





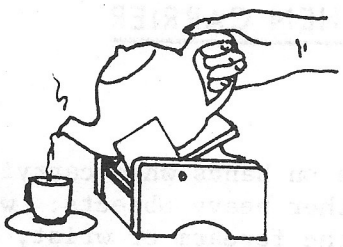
MATERIALS:

1" wide strip of aluminum (.040 .18 ga. utility sheet), as long as the circumference of the pot just below the original handle, plus 4"

6" length of 1" x 1¼" wood, with one end curved to match the curve of the pot.

CONSTRUCTION:

1. Curve the aluminum to the shape of the pot.
2. Bend the aluminum 2" from the ends.
3. Bolt the aluminum onto the wood so that it is drawn snugly around the pot.



POURING STAND

PURPOSE:

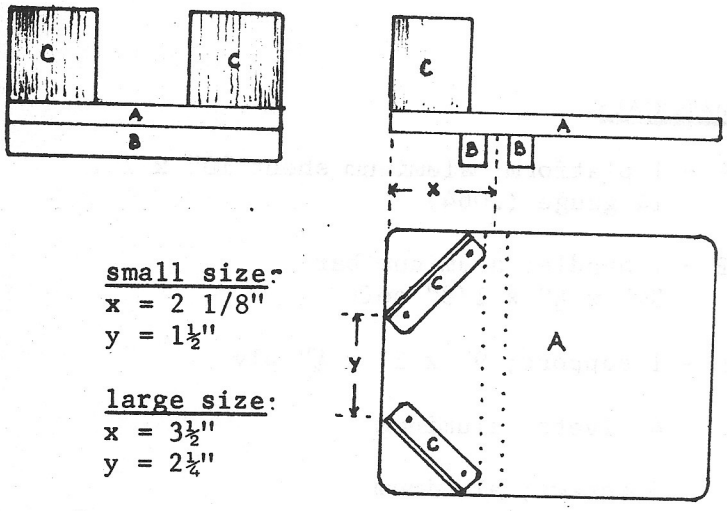
To eliminate lifting and holding tea pot, kettle or other heavy objects when hands and wrists are painful or weak.

CONSTRUCTION:

The position of the pivot dowel determines the balance: if too far back the center of gravity is too far forward and motion is too abrupt. It will depend on the size of the object.

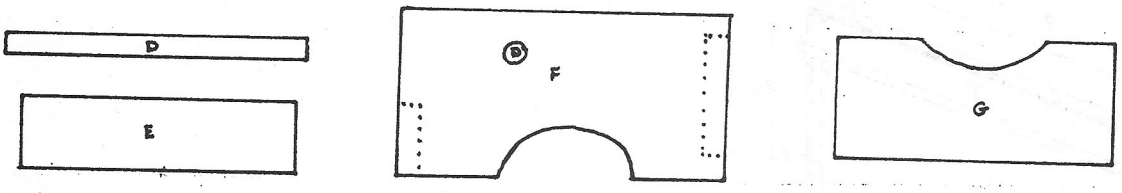
The stops C should be placed at right angles. They should be high enough to restrain object during maximum tipping; the level of the maximum circumference may be best.

Suggested positioning of C and D is given at left.



small size:
x = 2 1/8"
y = 1½"

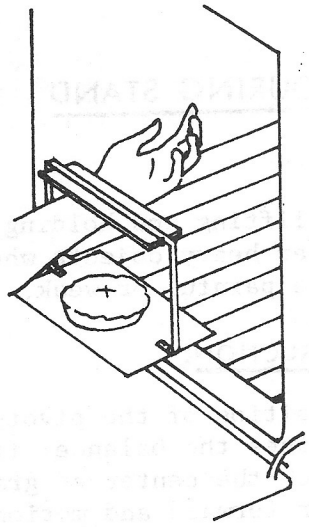
large size:
x = 3½"
y = 2¼"



MATERIALS:

	Small		Large
A (top)	6 3/4" x 5 5/8" x ½" ply covered with Arborite	A (top)	10½" x 7 3/4" x ½" ply covered with Arborite
B (struts)	2 of 5 5/8" x 3/4" x ½" wood	B (struts)	2 of 7 3/4" x 3/4"x ½" wood
C (stops)	2 of 2½" x 2½" aluminum soft ST 50, .14 gauge (.064) bent to 90 degrees, ½" from bottom	C (stops)	2 of 4" x 3½" aluminum soft ST 50, .14 gauge (.064) bent to 90 degrees, 3/4" from bottom
D (pivot)	6¼" x ½" dowel	D (pivot)	8½" x 3/4" dowel
E (front)	5 3/4" x 1 3/8" x ½" ply	E (front)	8" x 1 3/8" x ½" ply
F (sides)	2 of 6 3/4" x 3½" x ¼" ply	F (sides)	2 of 10½" x 4½" x ¼" ply
G (back)	5 3/4" x 2½" x ½" ply	G (back)	8" x 3¼" x ½" ply

Adapted from design of Wellesley Hospital, Toronto (see Canadian Journal of Occupational Therapy Vol. 36, No. 1 Spring 1969 pg. 19)



KITCHEN CARRIER

PURPOSE:

To relieve stress on hands when carrying casseroles and other heavy objects: weight can be borne on the forearm or wrist, and the dish slid from counter or trolley onto the carrier and then to oven, or other surface. Balance needs to be good.

MATERIALS:

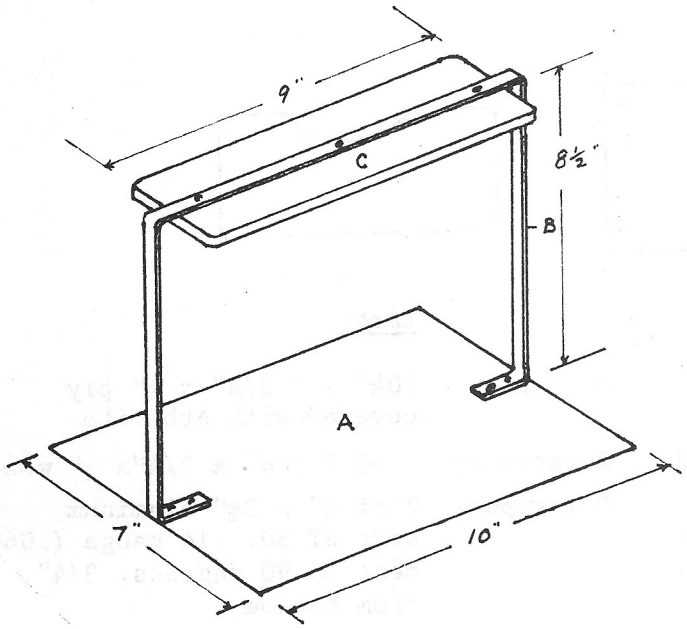
A - 1 platform; aluminum sheet 10" x 7", 14 gauge (.064)

B - 1 handle; aluminum bar 30" x ½" x 1/8" soft

C - 1 support; 9" x 3" x ½" ply

4 rivets; aluminum

3 screws; aluminum



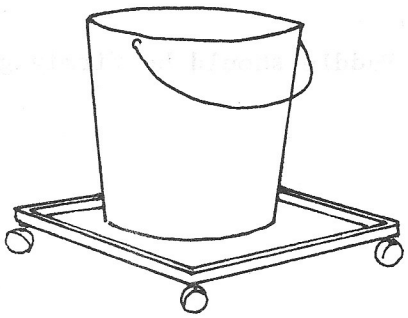
CLEANING AIDS

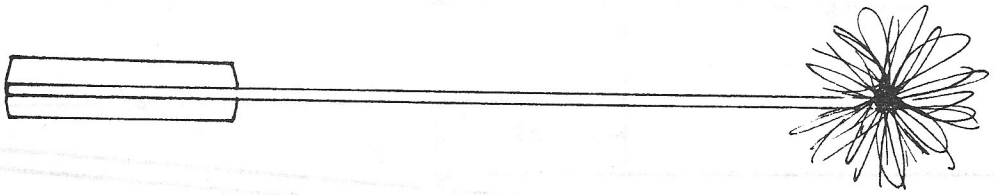
SWEEPING:

A light-weight child's broom or whisk with an extended handle, and an extended dustpan eliminate the need to bend over when knees or hips are stiff or painful.

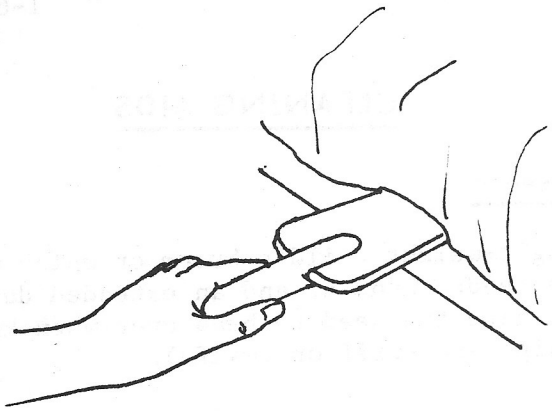
CLEANING:

When washing the floor a wheeled platform under the bucket will save carrying





Nylon net on an extended handle will help to clean hard-to-reach areas of the bathtub or sink. The handle tip should be well padded under the net to prevent scratching.



SHEET TUCKER

PURPOSE:

To lessen stress on fingers when tucking in bedclothes.

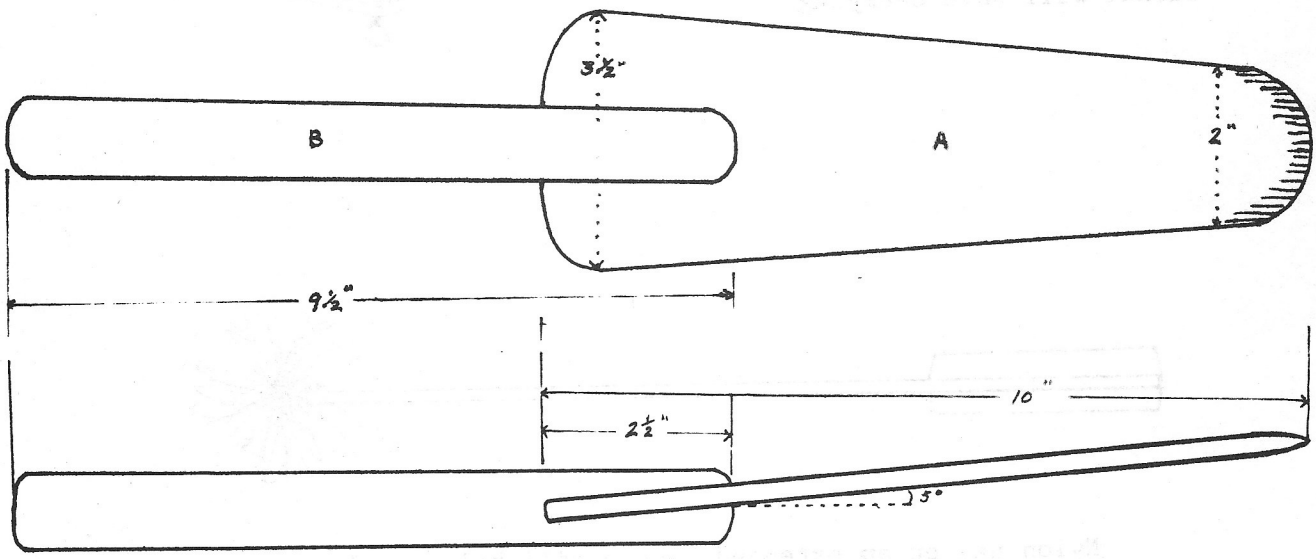
MATERIALS:

A - 1 paddle; 10" x 2" 3½" x ¼" ply (bevelled at tip)

B - 1 handle; 9½" x 1" dowelling with 2½" slot to accommodate paddle

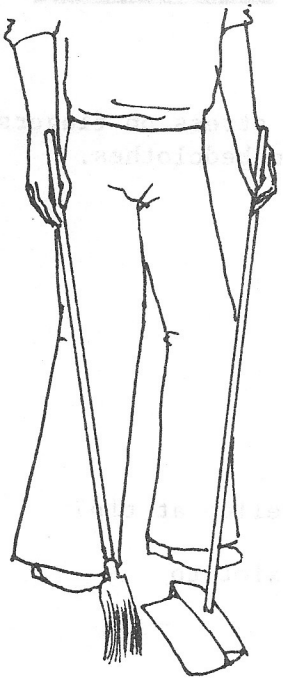
2 screws

Paddle should be firmly glued into place as well as screwed.



Adapted from (Toronto) Wellesley Hospital design

CLEANING AIDS

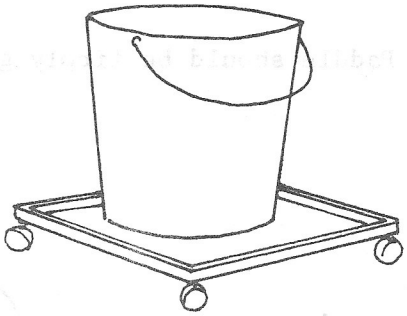


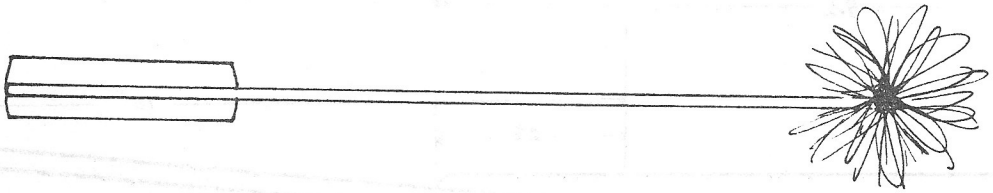
SWEEPING:

A light-weight child's broom or whisk with an extended handle, and an extended dustpan eliminate the need to bend over when knees or hips are stiff or painful.

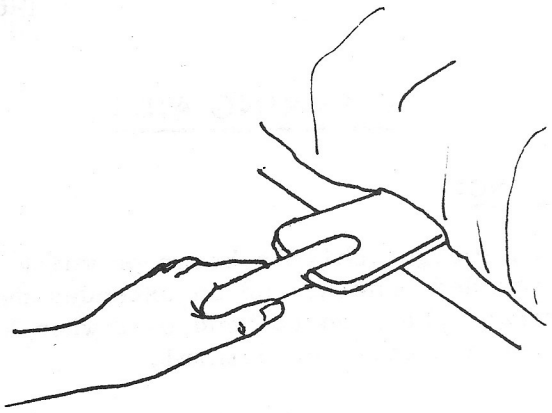
CLEANING:

When washing the floor a wheeled platform under the bucket will save carrying





Nylon net on an extended handle will help to clean hard-to-reach areas of the bathtub or sink. The handle tip should be well padded under the net to prevent scratching.



SHEET TUCKER

PURPOSE:

To lessen stress on fingers when tucking in bedclothes.

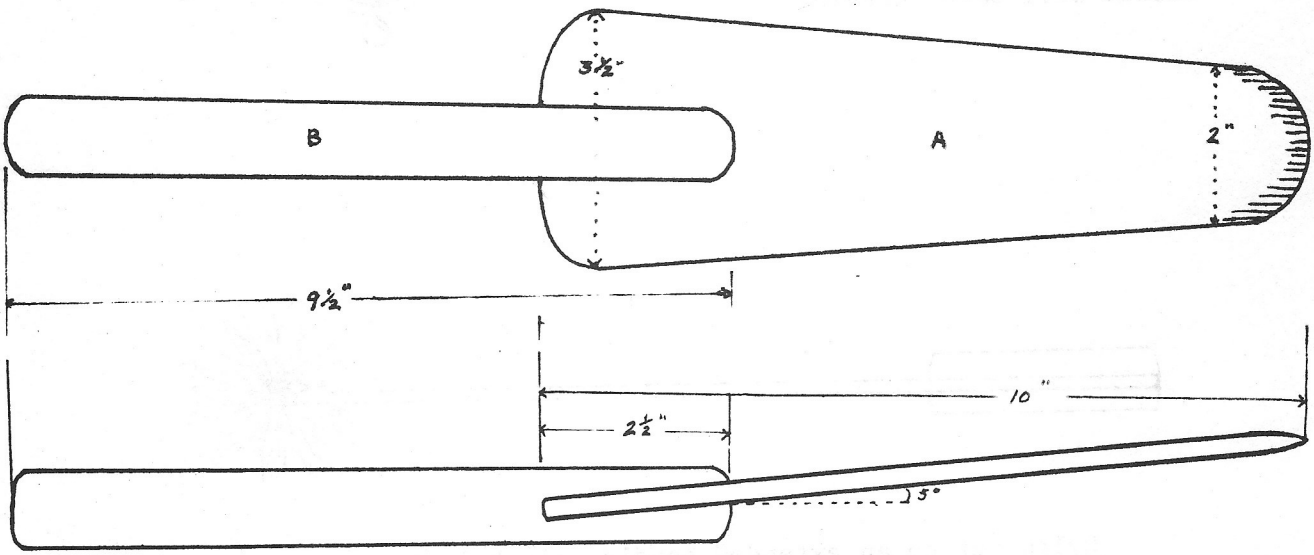
MATERIALS:

A - 1 paddle; 10" x 2" 3½" x ¼" ply (bevelled at tip)

B - 1 handle; 9½" x 1" dowelling with 2½" slot to accommodate paddle

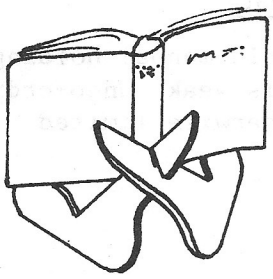
2 screws

Paddle should be firmly glued into place as well as screwed.



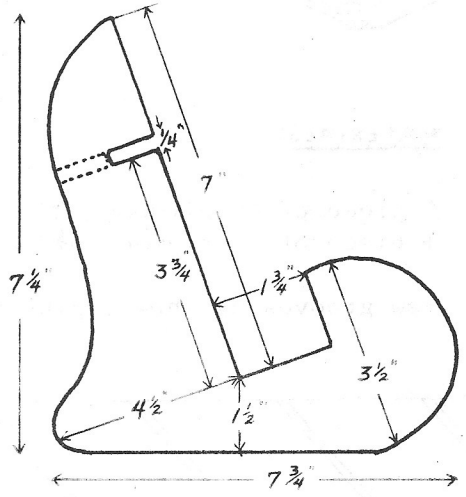
Adapted from (Toronto) Wellesley Hospital design

BOOK HOLDER



PURPOSE:

To support book or magazine so hands are relieved of static holding.

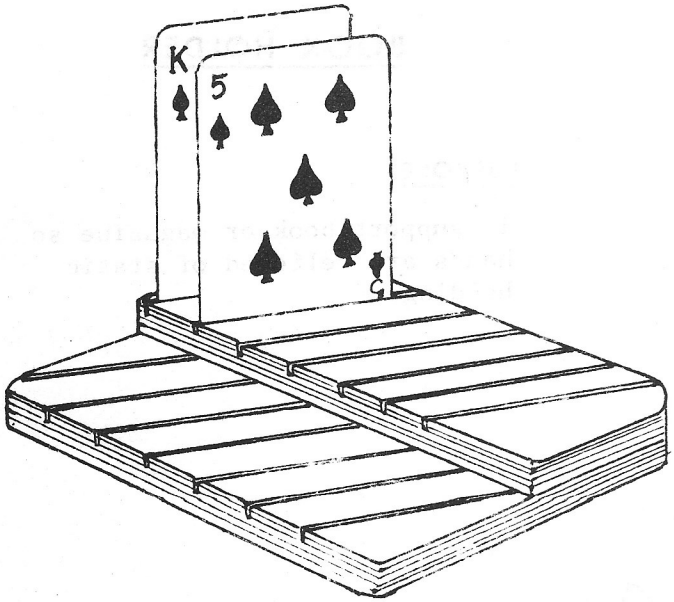


MATERIALS:

2 pieces of ¼" plywood, 7¼" x 7 3/4".

Cut to above shape, with slots on opposite sides of the two pieces so they will fit into each other.

CARD HOLDER



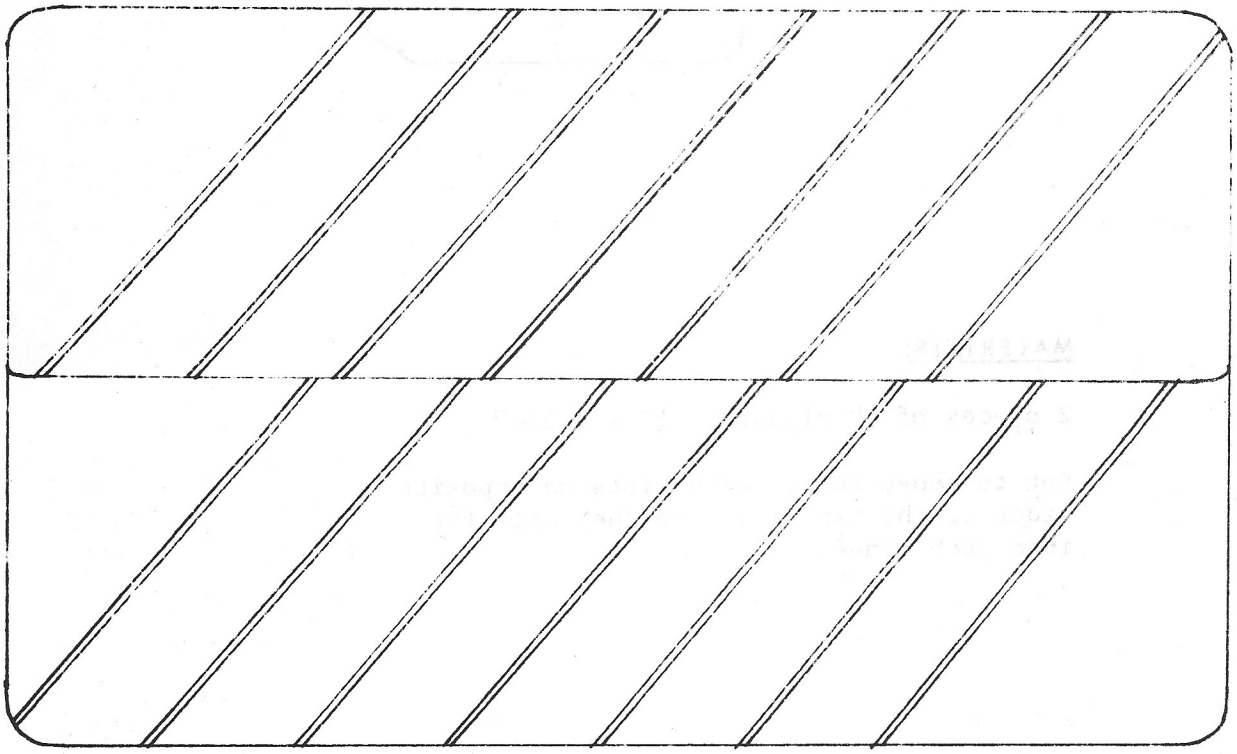
PURPOSE:

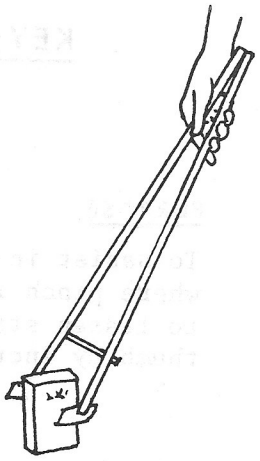
To avoid manual holding, when grip is weak, unco-ordinated or otherwise limited.

MATERIALS:

1 piece of ½" plywood 6¼" x 2"
1 piece of ½" plywood 6¼" x 4"

Saw grooves as shown; glue pieces together.

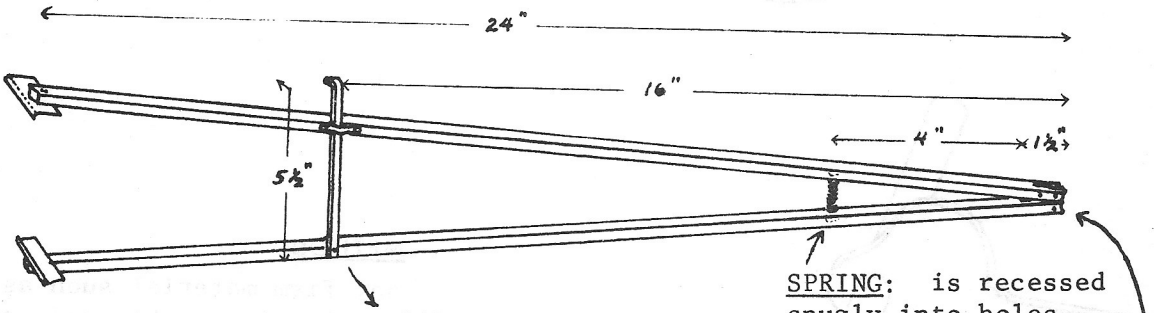


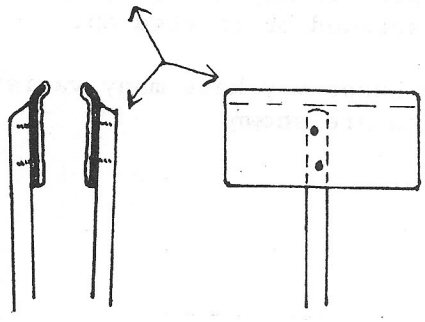


PICK-UP STICK

PURPOSE:

To enable persons with restricted reach to pick up objects from the floor or from a high shelf. Use is limited to lightweight objects if grip is weak. If used for heavy objects, thicker wood might be needed.



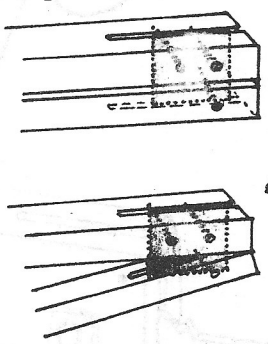


GRIPPERS: Screwed or riveted on firmly. Edges are bent in to provide fine pinch; they must be accurately aligned. Thin foam rubber cover will provide better grip.

BAR: Riveted to wood at one end so it will swivel. Other end is bent over to act as a stop.

Bar glides through a bridge of aluminum, which acts as a guide. It controls extension and gives stick more stability.

SPRING: is recessed snugly into holes drilled halfway through wood.

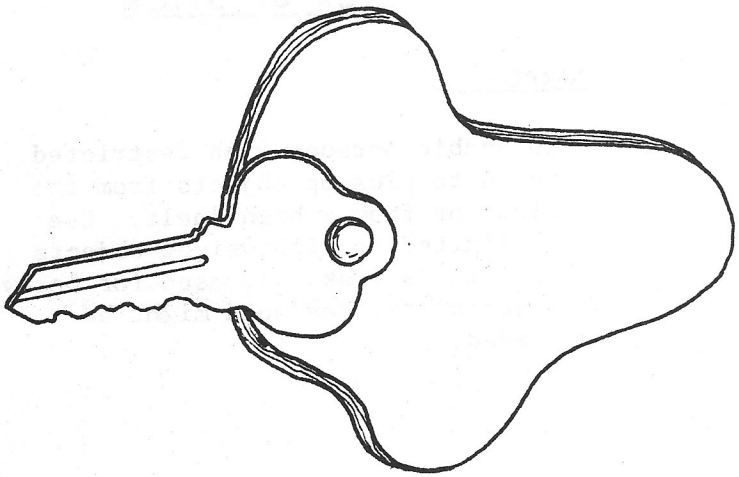


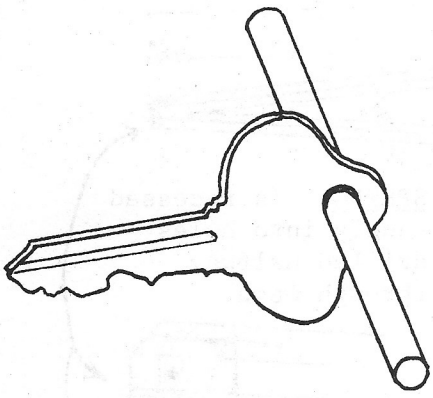
HINGE: Aluminum is inserted into slotted wood; screw or rivet acts as pivot.

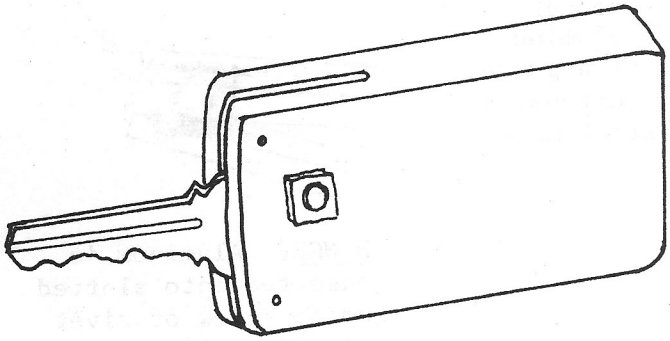
MATERIALS:

2 of 24" x ½" x ½" wood.
1 of 5½" x ½" x 1/8" bar aluminum 65 ST 6, for bar.
2 of 1½" x 3" utility aluminum, for grippers.
1 of 1½" x ½" utility aluminum, for bridge.
1 of 1" x 1¼" utility aluminum, for hinge.
1 compression spring, 2" long; .030 wire; .337 O.D.; 20½ coils; ends square, not ground.
2 of 1½" x 3" thin foam rubber (1/8")

KEY EXTENSION







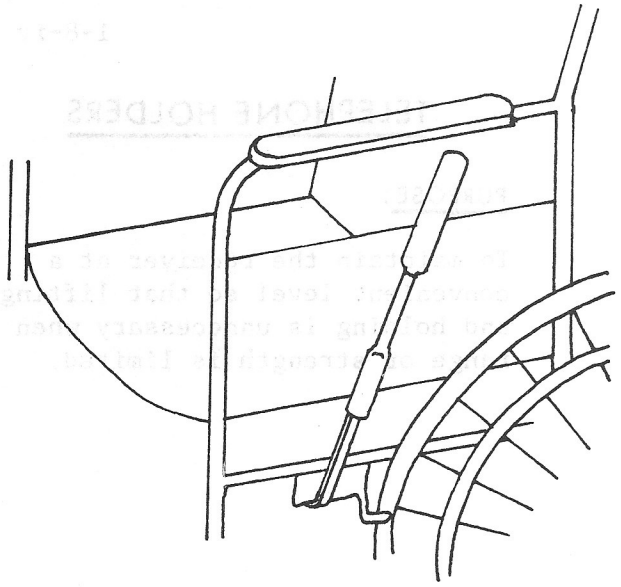
PURPOSE:

To assist in turning key, where pinch is weak or painful; to lessen stress on fingers and thumb by increasing leverage.

METHOD:

Any firm material such as wood or plastic may be used, and may be screwed or riveted on.

The shape may have many variations; a few are shown.

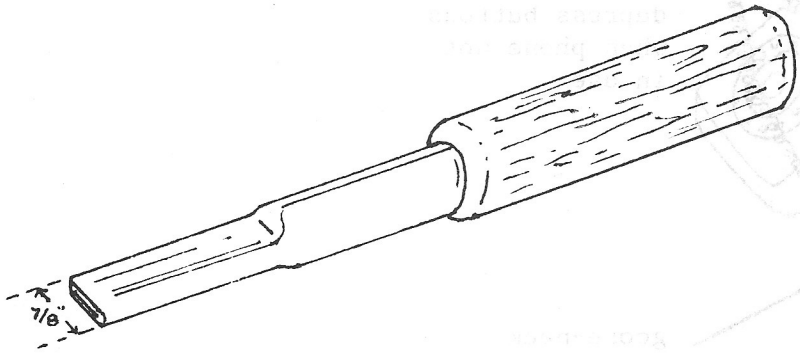


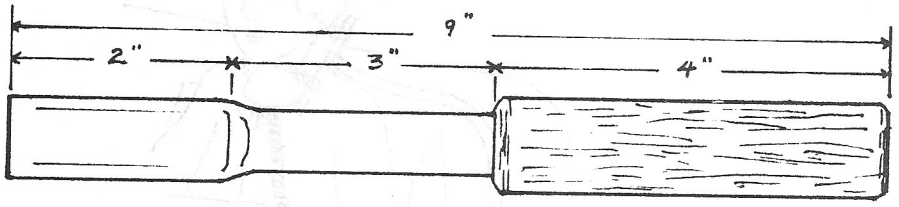
BRAKE EXTENSION

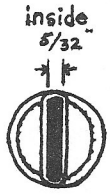
WHEELCHAIR

PURPOSE:

1. To provide leverage when hand is weak.
2. To extend brake when reach is limited.







MATERIALS:

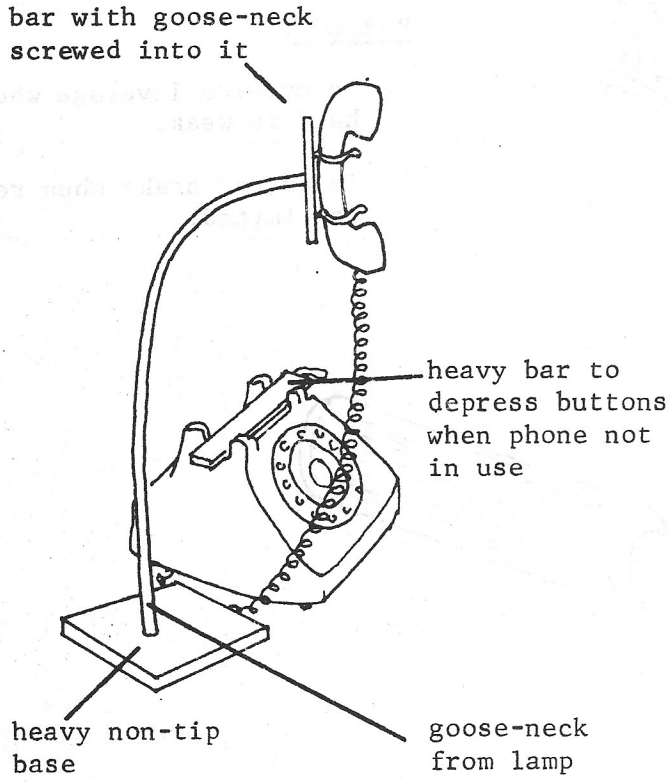
½" inner diameter aluminum tubing, flattened at one end. (1/16" thickness)

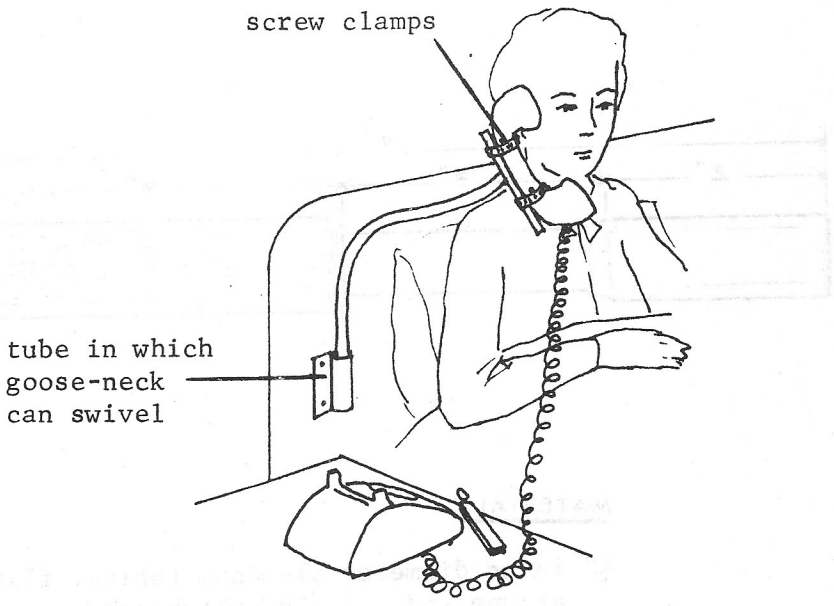
4" of 1" dowel, narrowed at one end and wedged, and glued into aluminum.

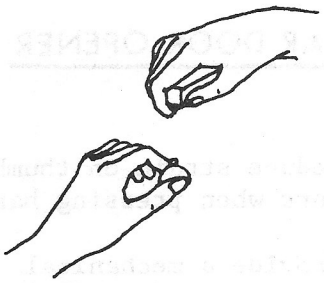
TELEPHONE HOLDERS

PURPOSE:

To maintain the receiver at a convenient level so that lifting and holding is unnecessary when range or strength is limited.


bar with goose-neck screwed into it
heavy bar to depress buttons when phone not in use
heavy non-tip base
goose-neck from lamp





WATCH WINDER

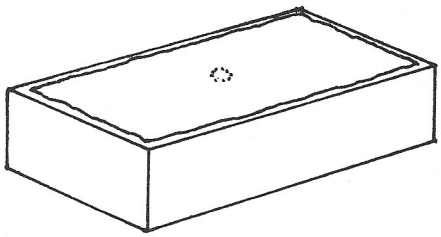
PURPOSE:

To facilitate watch winding when fine movements are awkward or painful.

MATERIALS:

1" x 2" x ½" wood, with a hole the exact diameter of the watch knob drilled in its centre

1" x 2" dental dam, stretched tautly over the hole and glued to the wood



CLOCK KEY

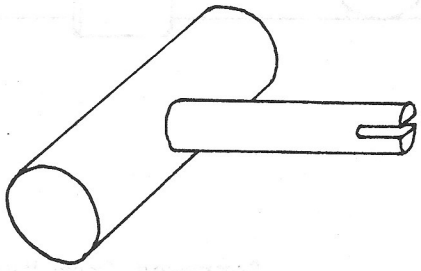
PURPOSE:

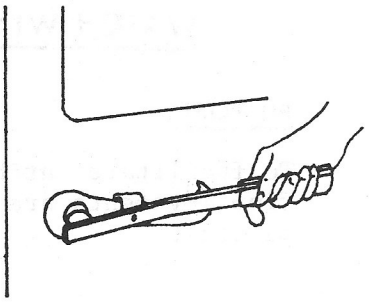
To provide leverage for turning winder when hands are weak or painful.

MATERIALS:

3" of 3/4" dowelling

2½" of ½" dowelling, with slot in one end





CAR DOOR OPENER

PURPOSE:

1. To reduce strain on thumb and fingers when pressing handle.
2. To provide a mechanical advantage when hands are weak.

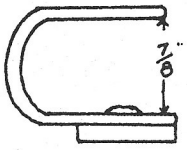
MATERIALS:

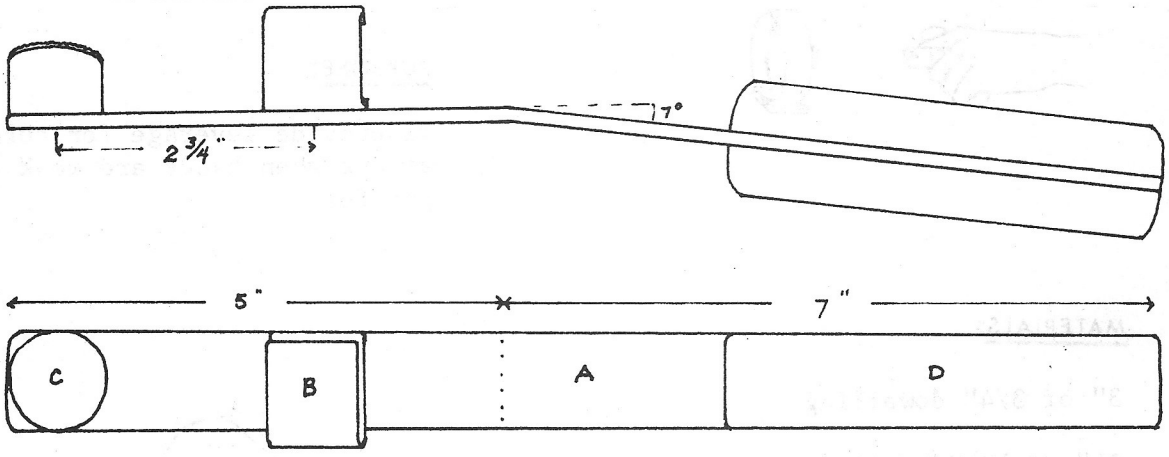
A - 1 lever; 3½" x 1" x 1/8" soft aluminum

B - 1 hook; 3½" x 1" x 1/8" soft aluminum

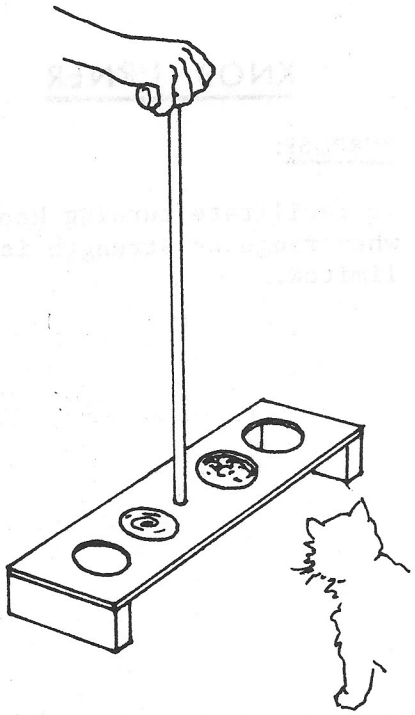
C - 1 knob; 3/4" x 1" dowelling, rounded and capped with non-slip material

D - 2 handle pieces; 4½" x 1" x ½" wood
1 rivet, aluminum





Borrowed from "Principles of Joint Protection in Chronic Rheumatic Disease" by Merete Brattström, studentlitterature, Lund, Sweden, 1973



PET FEEDER

PURPOSE:

To make it possible to lift feeding dishes to and from floor when hip or knee motion is restricted

MATERIALS:

(measurements depend on size of dishes and height needed)

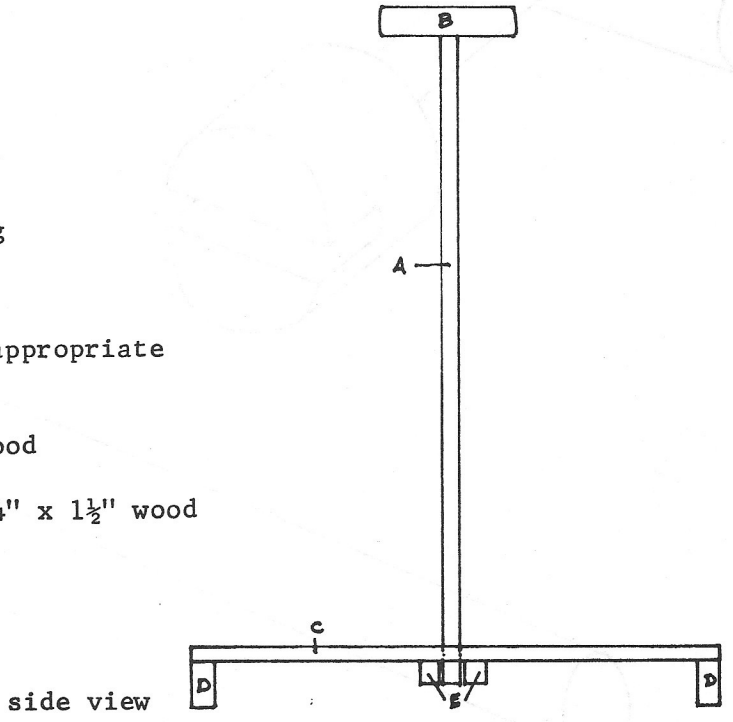
A - 1 extension; ½" dowelling

B - 1 handle; 1" dowelling

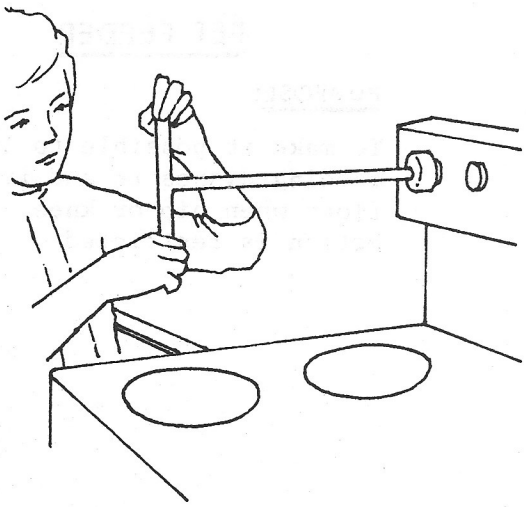
C - 1 platform; ½" ply with appropriate holes cut out

D - 2 supports; 1½" x 3/4" wood

E - 2 stabilizers; 3/4" x 3/4" x 1½" wood



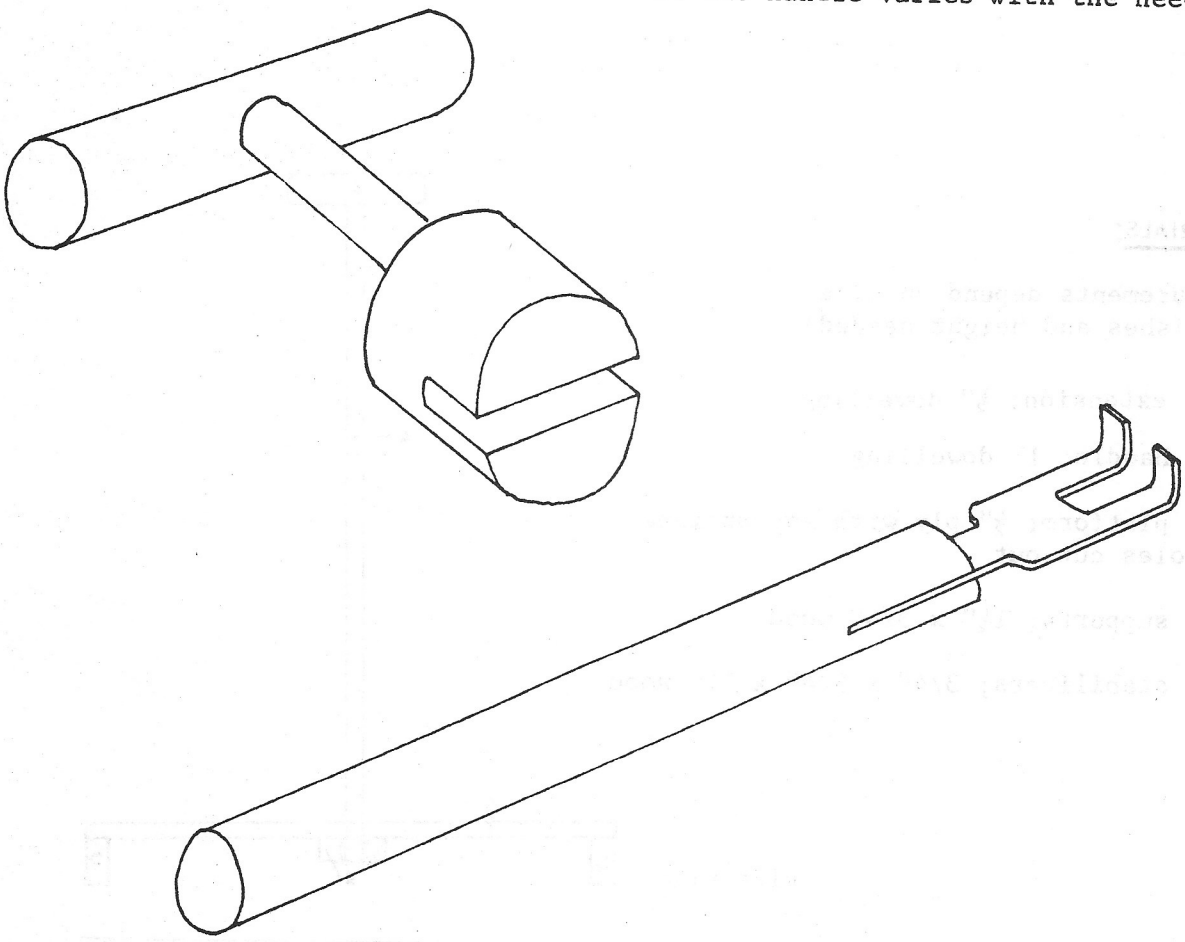
KNOB TURNER



PURPOSE:

To facilitate turning knobs when range or strength is limited.

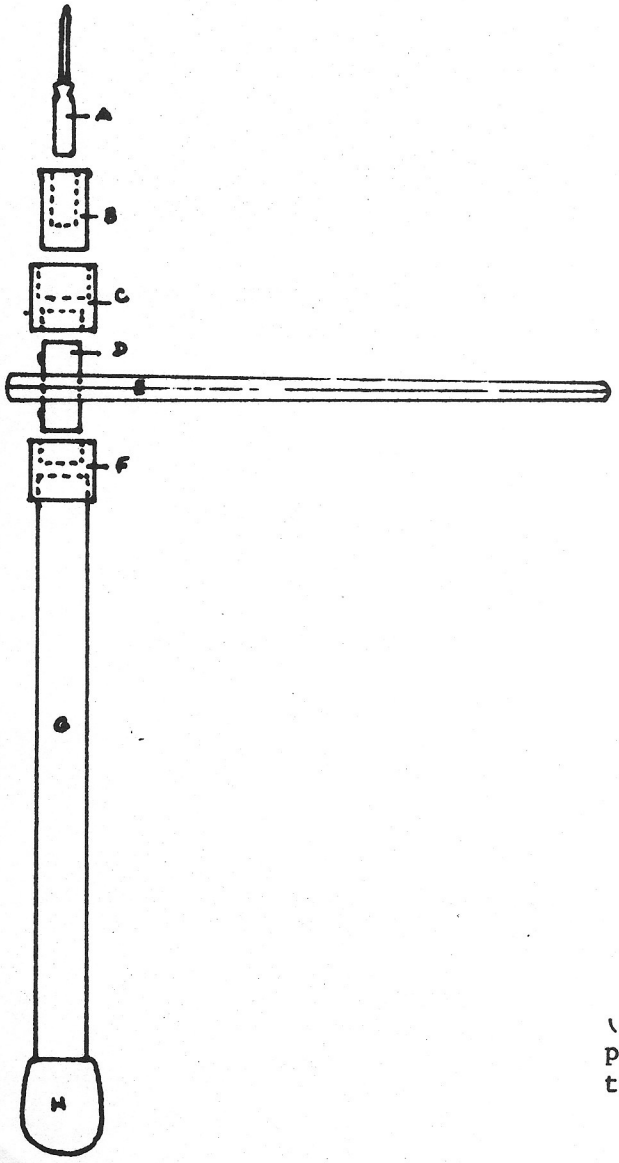
The type of attachment depends on the shape of the knob or dial; the length of the handle varies with the need.



RATCHET SCREW DRIVER

PURPOSE:

To lessen stress on hands and wrists; the lever removes the need for supination-pronation and gives a mechanical advantage.



MATERIALS:

A - 1 screwdriver

B - 1 handle for interchangeable screwdrivers.

C - 1 socket appropriate for size of handle

D - 1 socket adapter (1¼" or longer)

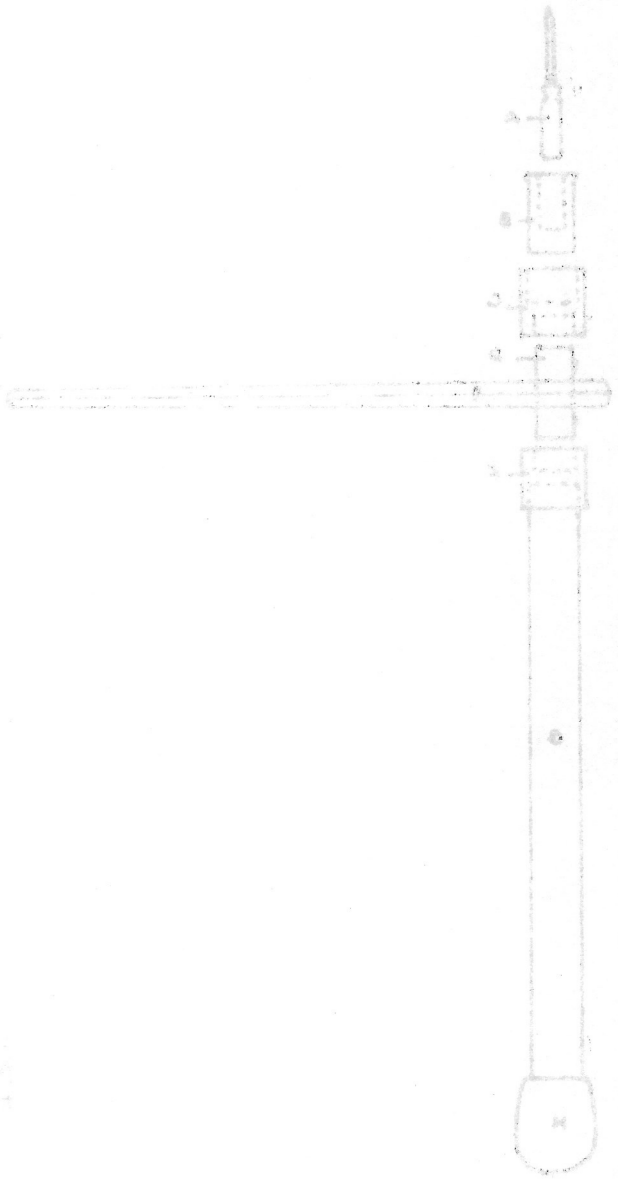
E - 1 drive hex rachet lever

F - 1 socket, 7/8"

G - 1 aluminum pipe, 3/4" x 9"

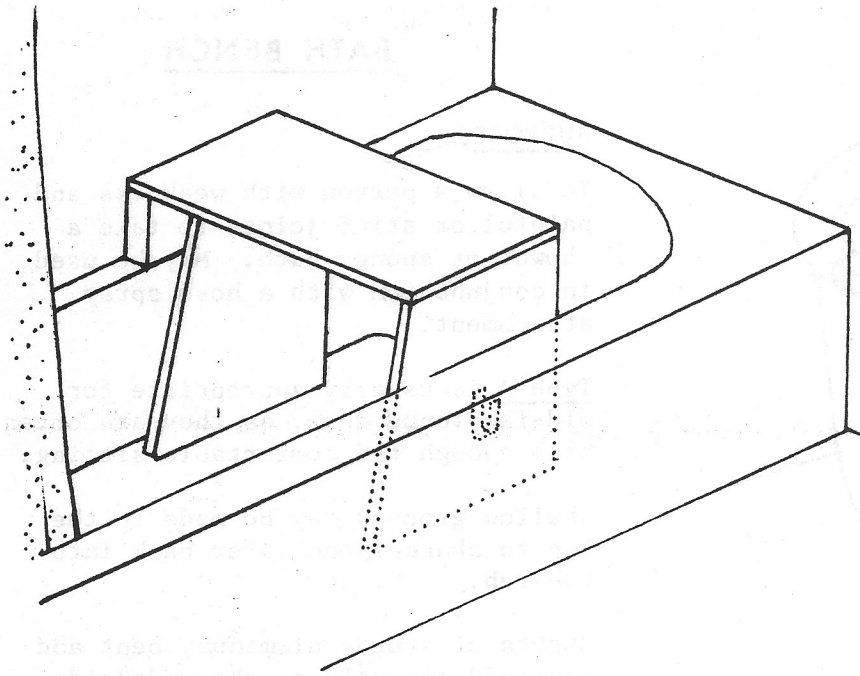
H - 1 rubber tip

change the direction of action (screw/unscrew), the sockets are pulled off the adapter and the lever turned upside down.



PART II

ENVIRONMENTAL ADAPTATIONS

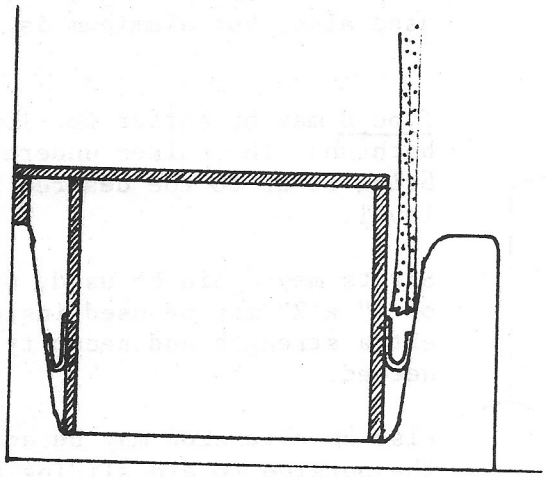


BATH STOOL

PURPOSE:

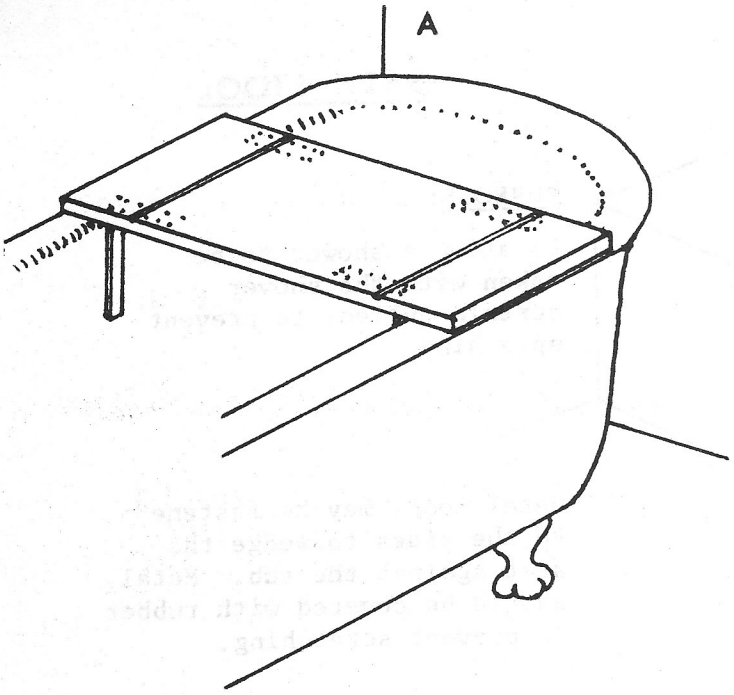
To allow a shower to be taken with the shower curtain pulled, to prevent splashing

Metal loops may be fastened to the sides to wedge the seat against the tub. Metal should be covered with rubber to prevent scratching.



If a shower stall is available, a sturdy high stool may be used in it instead.

BATH BENCH



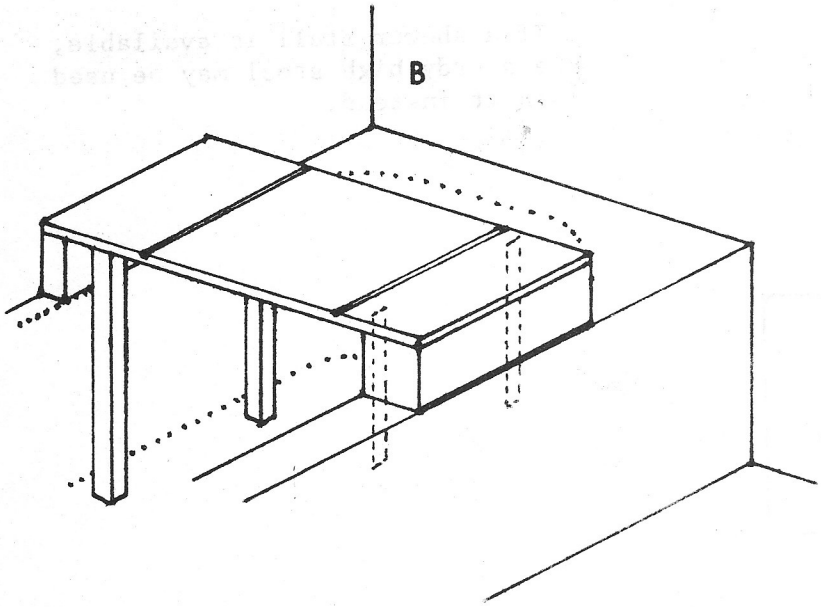
PURPOSE:

To allow a person with weakness and painful or stiff joints to take a shower or sponge bath. May be used in conjunction with a hose spray attachment.

Type A is usually appropriate for old-fashioned tubs, as they are often high enough for comfortable sitting.

Shallow grooves may be made in the top to channel the water back into the tub.

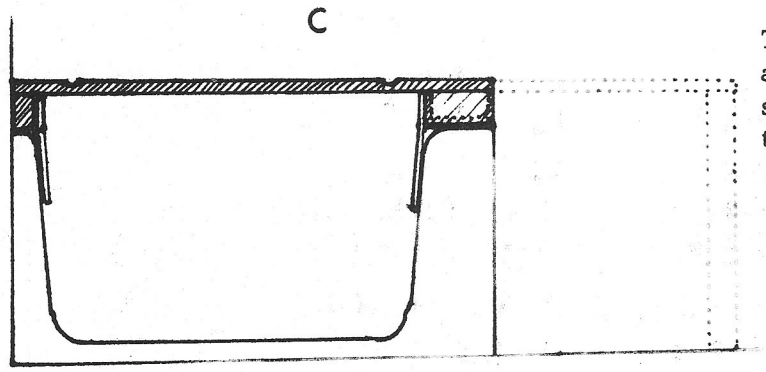
Struts of sturdy aluminum, bent and fastened securely on the underside, can be used to anchor the seat and prevent it from moving sideways. They should extend at least 6" below the tub top and be coated with rubber to prevent scratching. Wood may be used also, but aluminum is lighter.



Type B may be better for low, modern bathtubs; the raises underneath bring it up to the desired sitting level.

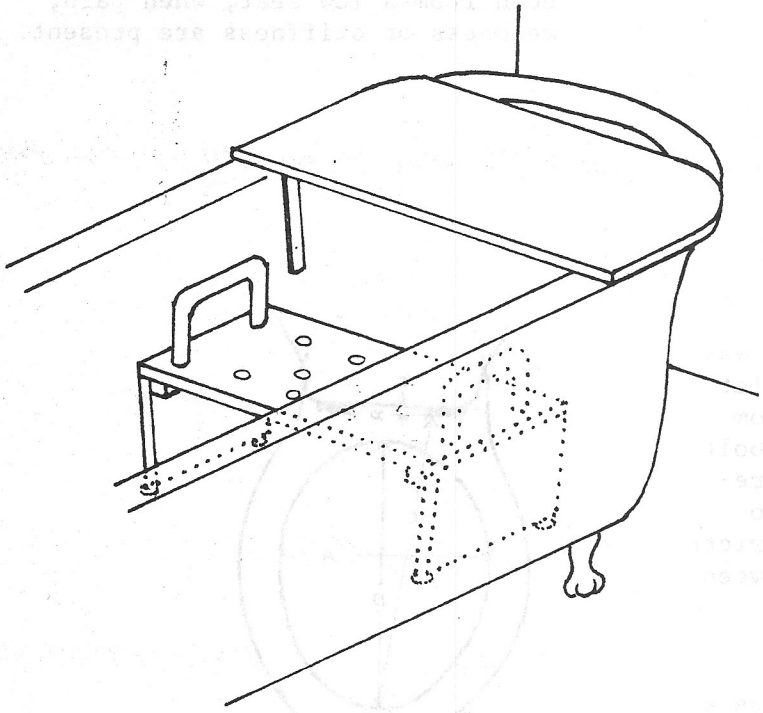
Struts may again be used, or posts of 2" x 2" may be used instead where extra strength and security are needed.

Also an extension may be added on the outside to aid sliding across. (C)



The seat should have rounded edges and be well sanded and painted; strips of foam rubber underneath the wood will help keep it stable.

BATH STEPS



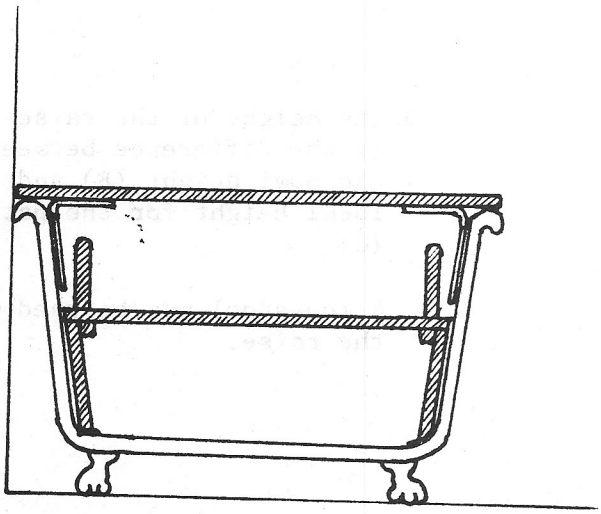
PURPOSE:

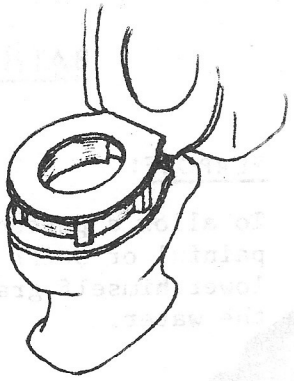
To allow a person with weak, painful or stiff joints to lower himself gradually into the water.

The upper extremeties need to be strong, and the tub needs to be long enough.

The lower bench may be used by itself if mobility is adequate. otherwise, one may sit on the top bench, swing the legs inside, then descend to the next level.

Holes may be made in the bottom bench to discourage it from floating. Also, suction cups may be used to anchor it firmly





RAISED TOILET SEAT - (Model A)

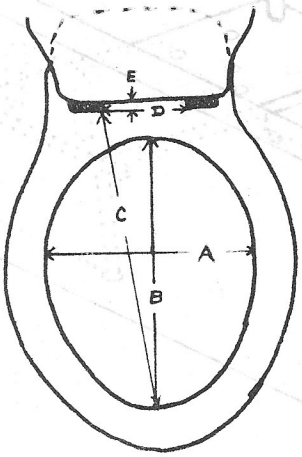
(Page 1 – MEASURING)

PURPOSE:

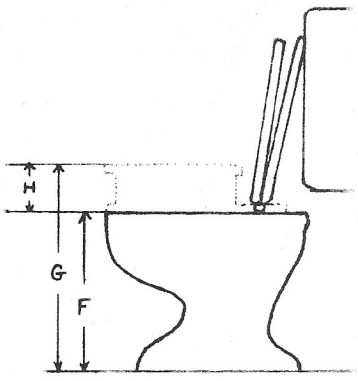
To lessen strain of getting up and down from a low seat, when pain, weakness or stiffness are present.

HOW TO MEASURE:

1. With seat and lid up out of the way, carefully measure inside of toilet bowl: from side to side (A), from front to back (B) and front to bolt attaching seat (C). Take measurements ½" down inside from top to allow for curve. Also measure width (D) and height (E) of space between bolts.



2. To get the general contour, place a newspaper tautly over the bowl, and with a pencil trace around the inside edge.



3. The height of the raise (H) is the difference between the bowl height (F) and the ideal height for the patient (G)

   A footstool may be used with the raise.

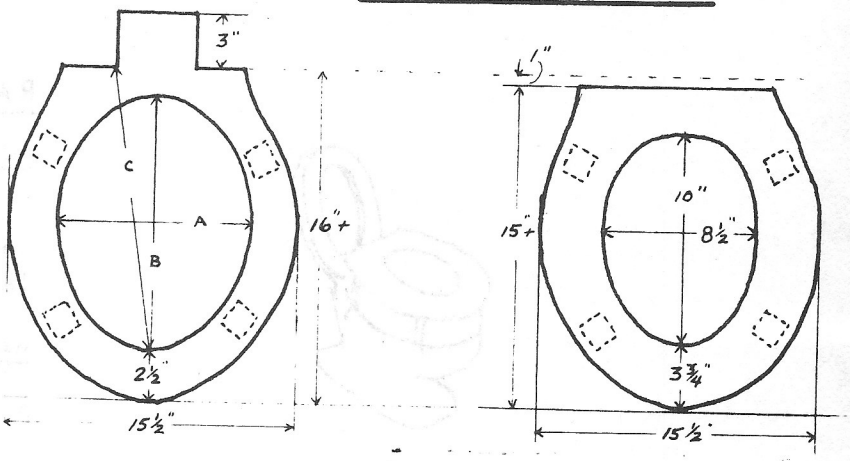
(cont'd - page 2)

RAISED TOILET SEAT - (Model A)
(Page 2 - CONSTRUCTION)

Tongue:

This fits between the bolts of the lifted seat and lid and prevents the eaise from tipping.

If the space (E) is less than 5/8", the tongue may need to be thinned, or replaced with 14 ga. aluminum, countersunk on underside.

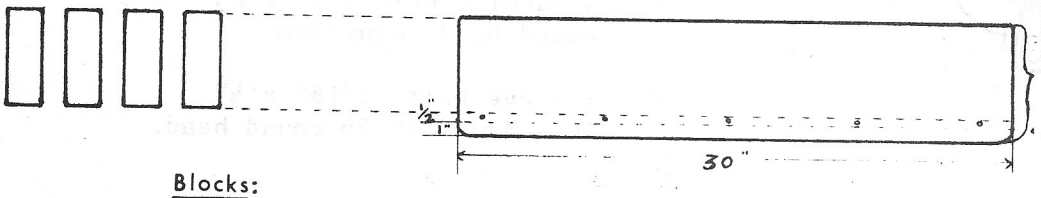


Bottom:

½" plywood
Cut according to measurements and contour described on preceding page. The length (C) is important, as if this is too long, the raise will not fit into the bowl

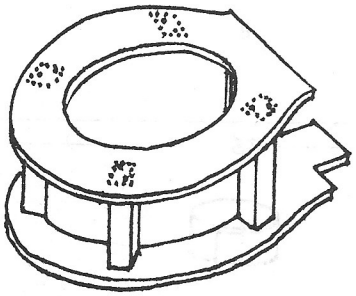
Top:

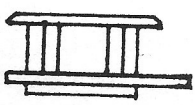
½" plywood
Cut to above measurements, or adjust as necessary.
Length is 1" shorter than Bottom.
Round and sand all edges very well.

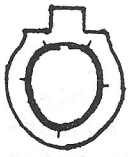


Blocks:

Cut 4 of 2" x 2", 1" shorter than desired finished height of raise







Guard:

Made of .040,18 ga. utility sheet aluminum. This fits around the inside of the raise and acts as a splash guard; it projects down below the raise into the bowl, preventing sideways slipping.

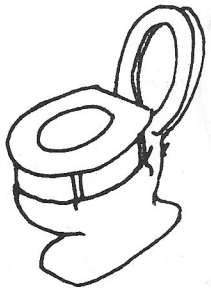
TO ASSEMBLE:

Attach blocks to bottom with countersunk screws; line up top so that its front edge is directly above that of the bottom. Attach to blocks with countersunk screws; fill holes with filler and sand smooth.

Drill 5 evenly spaced holes in the guard. Curve it and fit inside the raise so that it butts up under the top, with the ends toward the back. Starting in the centre, drill matching holes in the inner rim of the bottom and screw in place with rustproof screws.

Paint wood and aluminum to match plumbing.

RAISED TOILET SEAT - (Model B)



PURPOSE:

To alleviate stress on damaged knees and to compensate for weakness or lack or range.

MATERIALS:

A - 1 toilet seat, commercially available

B - 1 guard, polyethylene; 1/16" low density, 38" x desired height + 2"

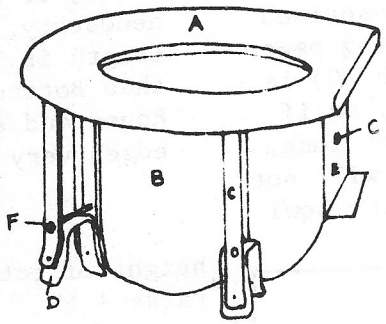
C - 4 supports, aluminum; 21¼" x 1" x 1/8" soft bar

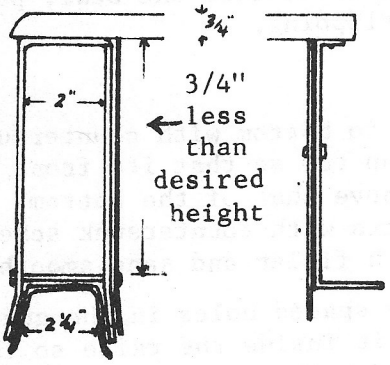
D - 4 liners, polyethylene; 1/16" low density 7¼" x 1 5/8"

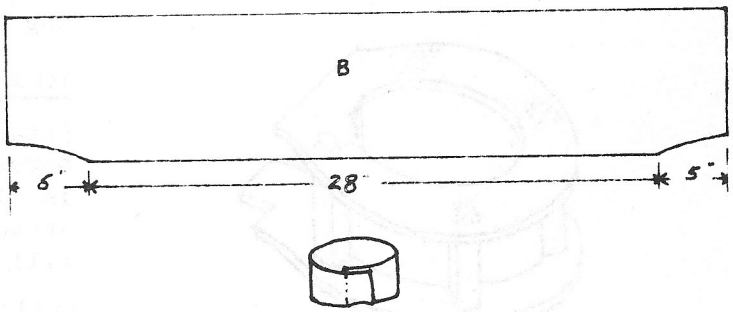
E - 1 tongue, aluminum, 9¼" x 4" x 14 gauge (.064) soft sheet

F - 4 machine bolts; ¼" x 2½" or 3" round head; aluminum

G - 1 stove bolt, 3/16" x ½"
10 screws; ½" #6 round head.

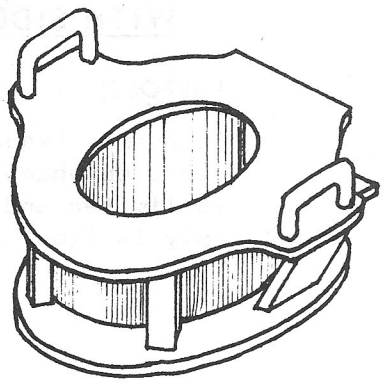






The height will vary with the need. This model fits most toilets with little adjustment. The tongue should wedge firmly under the raised original set to prevent tipping.

RAISED TOILET SEAT WITH HANDLES

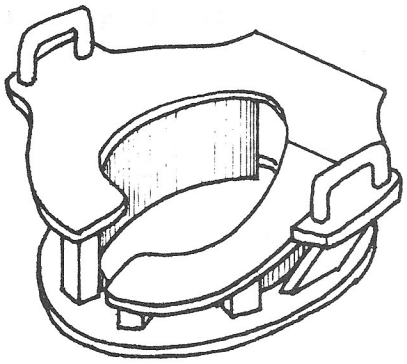


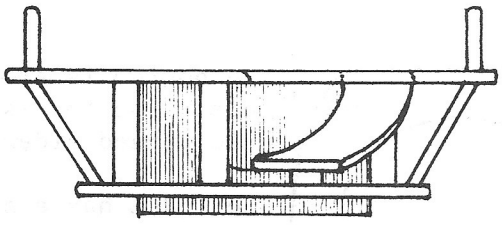
PURPOSE:

Useful where extra support or stability is needed; for example, when a knee is stiff.

The handle can be substitute for wall bars.

RAISED TOILET SEAT WITH ANGLED SEAT

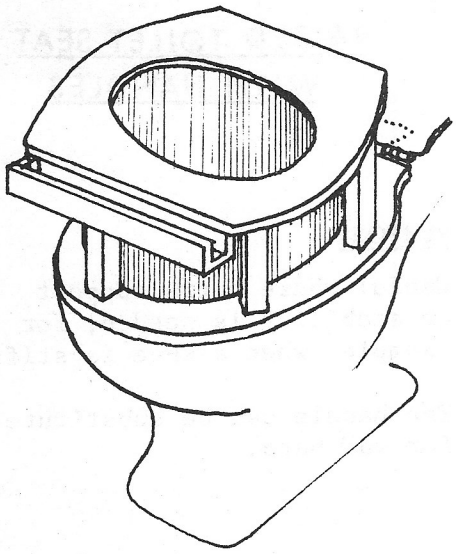




PURPOSE:

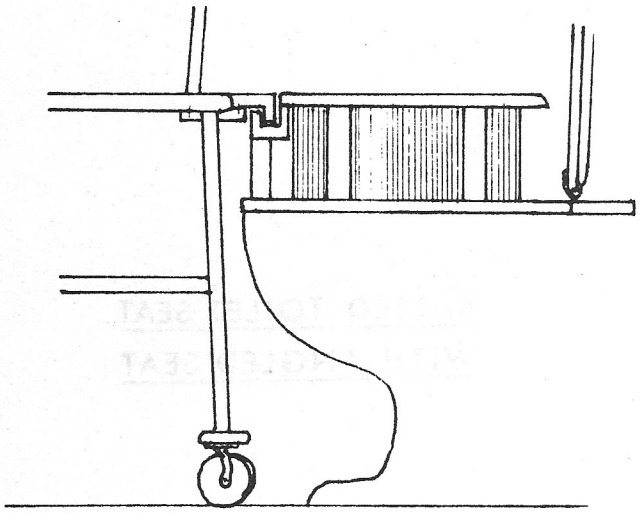
This is useful where one hip is fused in little flexion

RAISED TOILET SEAT WITH SIDEWARD TRANSFER

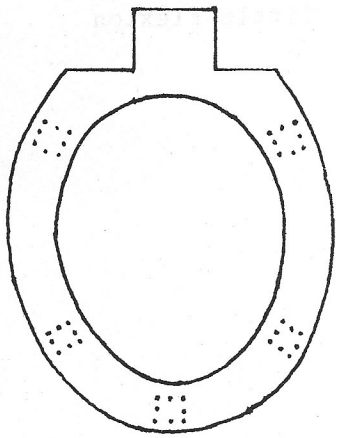


PURPOSE:

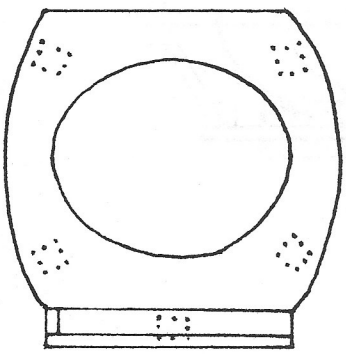
To permit transfer from a chair-on-wheels when space is limited and chair fits only in front of the toilet.



Chair is pushed in backwards, so that its ledge fits into the ledge on the raise.



Bottom



Top

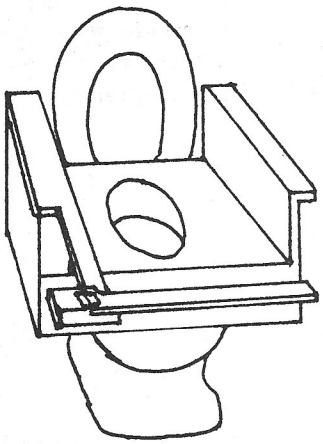
The bottom is standard for a raise; the top is cut with the hole turned sideways.

The ledge has a stop at the far end, to prevent chair from sliding too far.

RAISED TOILET SEAT WITH GRAB BAR

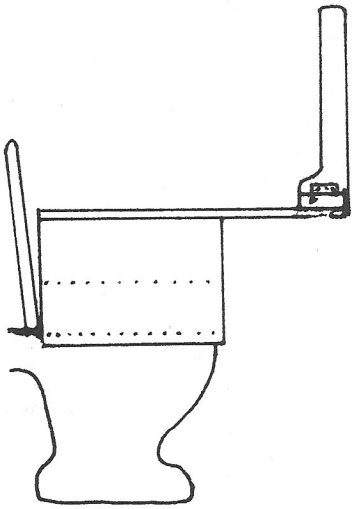
PURPOSE:

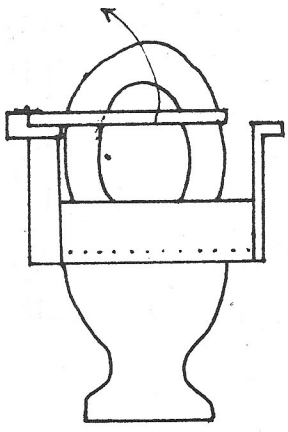
To provide a grab bar in conjunction with a higher seat so that there is less strain on knees.



A frame, wide enough to support arms on either side, fits over the toilet bowl; it incorporates the desired height of raise. It must be stabilized by a projection under the normal seat and lid to prevent tipping.

The grab bar is hinged so that it may be moved out of the way once a standing position is reached.

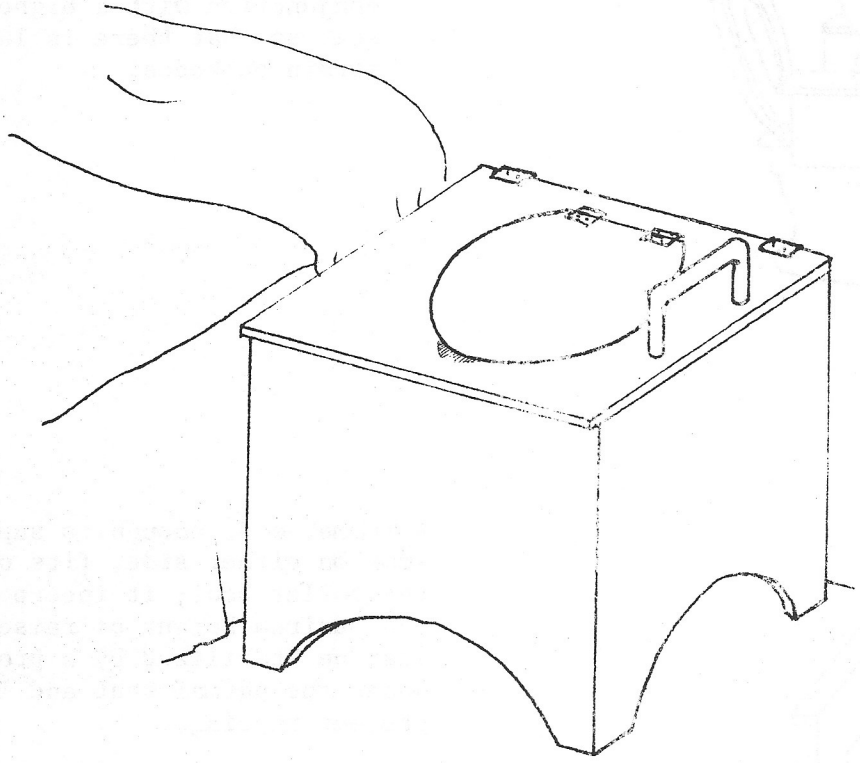




COMMODE

PURPOSE:

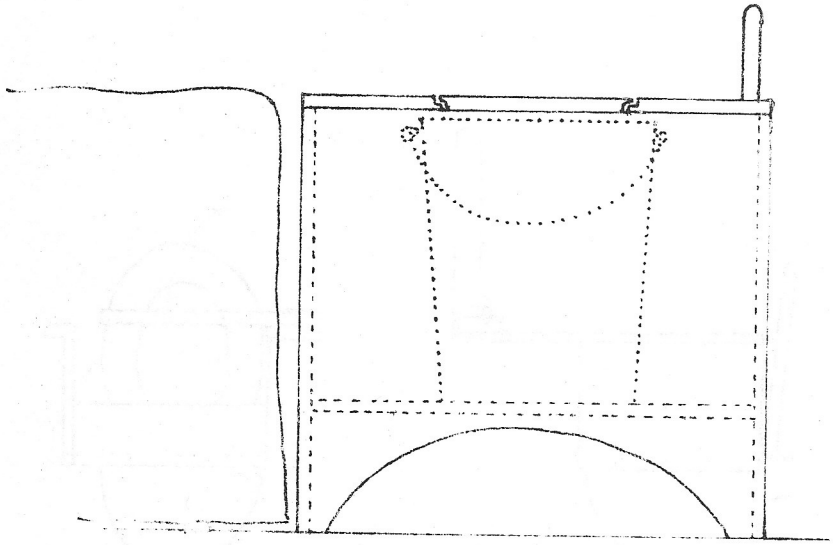
To facilitate independent toileting when disability limits ambulation.



Height of the commode should match that of other furniture, so that sliding is possible.

A handle may be helpful.

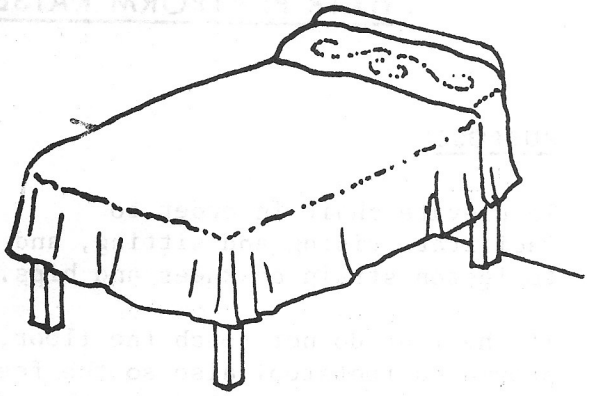
If the lid is flush with the top, the commode may double as a table, if used infrequently.



The shelf should be at a height which just allows room for a galvanized pail to fit inside.

The top should project forward slightly so that it may be easily lifted to remove pail. Also, the lid should have a depression ahead of it so that it may be easily lifted.

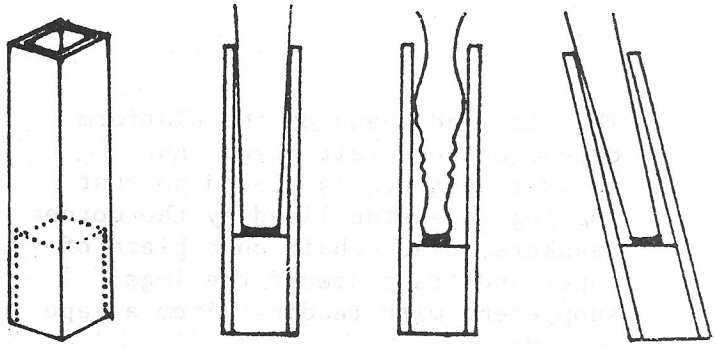
BED or CHAIR BLOCK



PURPOSE:

To elevate furniture in order to facilitate rising and sitting, and to lessen strain on knees and hips.

When used with a chair, provide a footstool also if the feet do not touch the floor.



The size of the opening should be only slightly bigger than the widest part of the leg to be inserted.

If the leg is angled, slant the block so that it sits level on the floor.

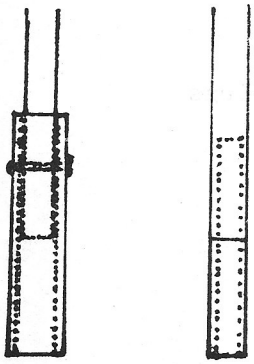
The inside block provides the raise. The outside shell should extend above the block at least 1½ times the height of the block, to provide stability.

The joints should be firmly made, to stand up to the stresses of furniture moving.

MATERIALS:

½" plywood for shell.

2" x 2", 3" x 3", etc block, depending on size of leg.



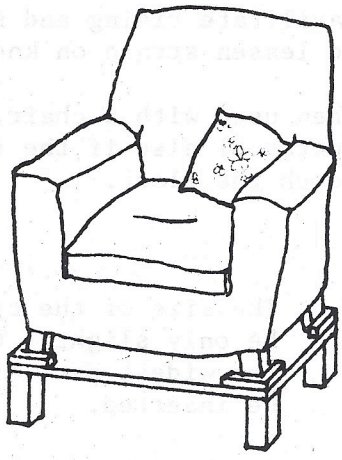
FOR ALUMINUM LEGS:

Extensions may be added by:

A) inserting leg into aluminum tubing and securing with a bolt.

B) using an internal "splint"; extend leg with the same diameter aluminum tubing, holding it in place with snug-fitting dowel.

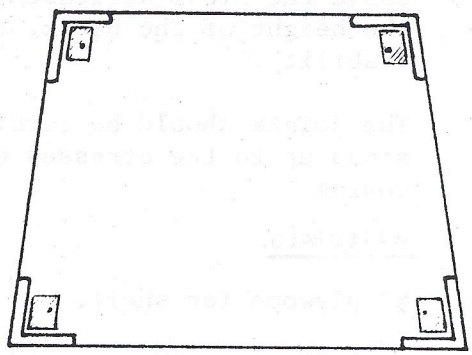
CHAIR PLATFORM RAISE



PURPOSE:

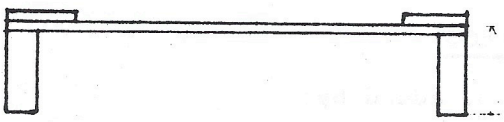
To elevate chair in order to facilitate rising and sitting, and to lessen strain on knees and hips.

If the feet do not touch the floor, provide a footstool also so the feet are supported.



The size and shape of the platform depend on the chair base. An accurate pattern is needed so that the legs are stabilized by the corner brackets: place chair on a piece of paper and trace around the legs; supplement with readings from a tape measure.

For added stability, it is wise to screw the legs of the chair onto the platform if possible.



The height of the raise is the difference between the height of the chair seat and the ideal height for the patient.

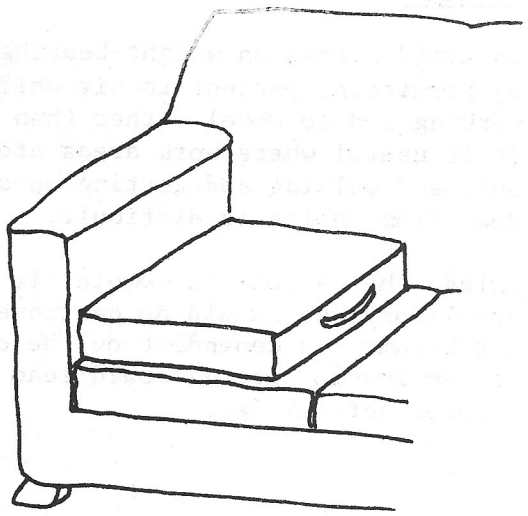
MATERIALS:

½" plywood

2" x 2" wood for the legs

½" x ½" wood edging

RAISED CUSHION



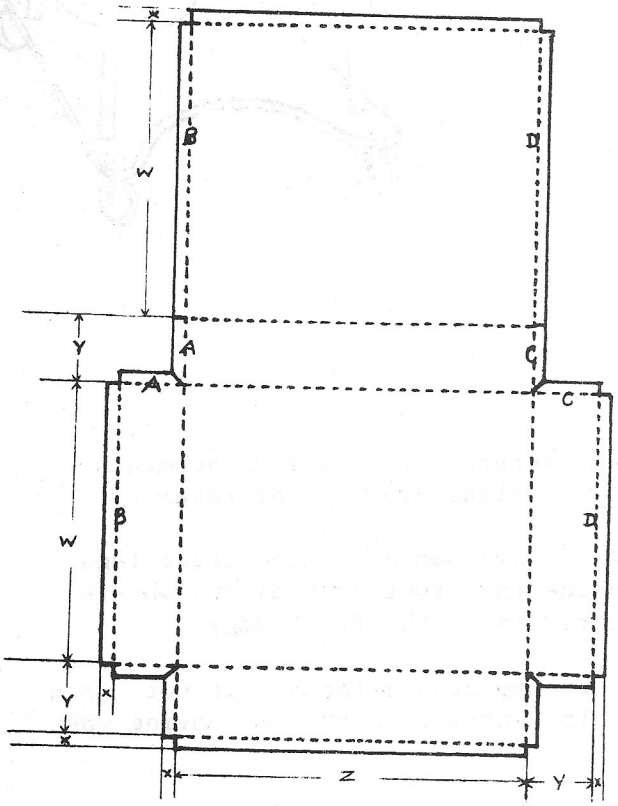
PURPOSE:

To provide a light-weight, firm raise when weak or painful joints make rising from a low surface difficult. It is an alternative to blocks or platforms under furniture, but should not be used in their place if it leaves inadequate back or arm support.

As it is portable, it may be taken wherever needed; a handle on the side facilitates carrying.

MATERIALS:

Foam rubber, for comfort (2" thick).
Sheet styrofoam (insulation type) for lightness and firmness. (1" to 4" is usually needed).
Sturdy fabric; non-slippery unless slide transferring is to be used.



METHOD:

Cut foam rubber and styrofoam to desired shape.
Glue layers together with white glue.
Cut accurate pattern for cover, with sides (y) same width as foam rubber + styrofoam.

Total width = 2x + 2y + z
Total length = 2x + 2y + 2w

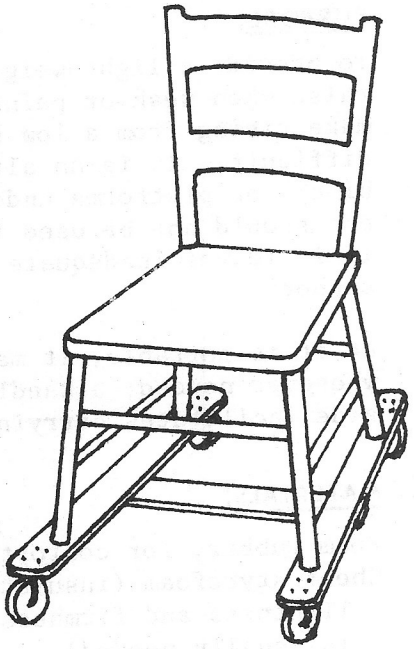
A, B, C, D, are seam allowances.

Join A to A, and B to B, (right sides together), then C to C, and D to D.

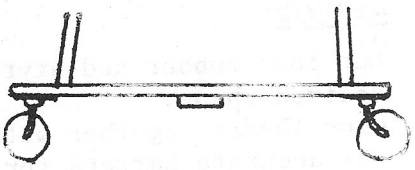
Turn right side out - pull over foam and styro and finish by hand.

If attaching a handle, reinforce on the inside.

CHAIR ON WHEELS



A

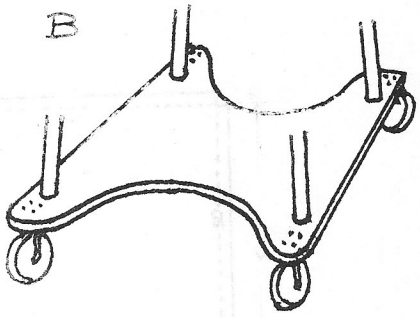


PURPOSE:

To avoid stress on weight-bearing joints by permitting patient to sit while working and to wheel rather than walk. It is useful where work areas are spread out, and walking and getting up and down from chairs is difficult.

Unless the patient is completely non-ambulatory, he should be cautioned to not become too dependent on the chair, as continuous sitting could lead to flexion deformities.

B



MATERIALS:

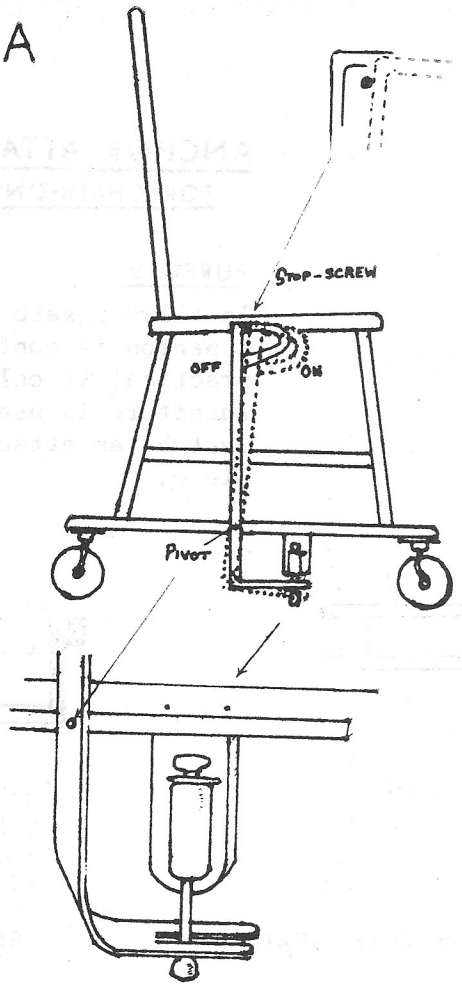
1 wooden chair
1 platform, of 2½" x 3/4" wood (A)
OR: 3/4" plywood (B)
1 set of 4" ball-bearing, swivel casters with plate attachments. This size of wheel allows easy wheeling over carpet edges.

The platform should extend 2" in front of and behind of the chair legs, so that the centre of the legs are inside the pivot area of the wheels. Otherwise the chair may tip if the weight is on the front edge.

Brakes may be attached (see diagram for suggested methods); if not, then the chair should be backed against a firm surface to prevent moving when getting up or down.

BRAKES FOR CHAIR ON WHEELS

A



A. MATERIALS:

1 pr. door-stops, plunger variety; shouldn't have very heavy spring. If available, a light spring which will remain locked against resistance, and which releases easily, may not need the aluminum lever. In this case, a cane, or any stick will work the brake simply by pressing on the plunger.

2 levers of aluminum 1" x 1/8" 65 ST firm, bent as shown, for each side; one end is forked, to fit around plunger; the other end is curved into a handle.

2 screws to act as pivots for the lever.

2 screws to act as stops for lever handles.

To Brake: Move lever out from chair so as to clear the stop-screw. Push forward until it is ahead of and held by stop-screw. This action forces plunger down.

To Release: Return lever to original position behind stop-screw. Release the door-stop by pressing on its handle with a stick.

B. MATERIALS:

1 bar of 1" x 4", as wide as chair platform.

Strip of firm rubber, attached to bottom edge.

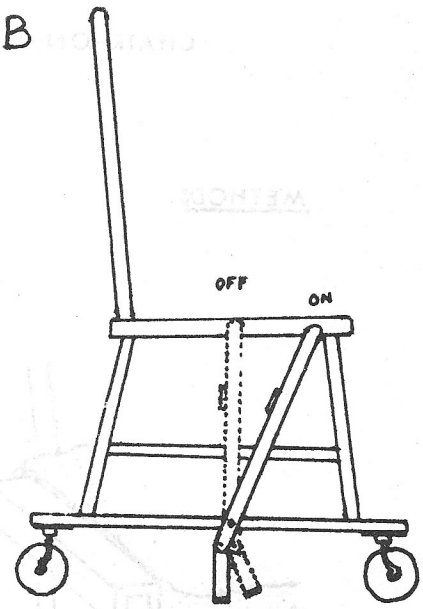
2 levers of 1" x ½" ply.

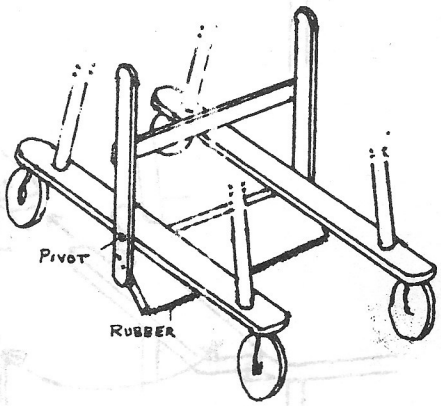
1 supporting strut of 1" x ½" ply.

2 screws, to act as pivots.

The levers are attached to the bar at an angle, so that as they are pressed forward, the bar wedges firmly against the floor.

B

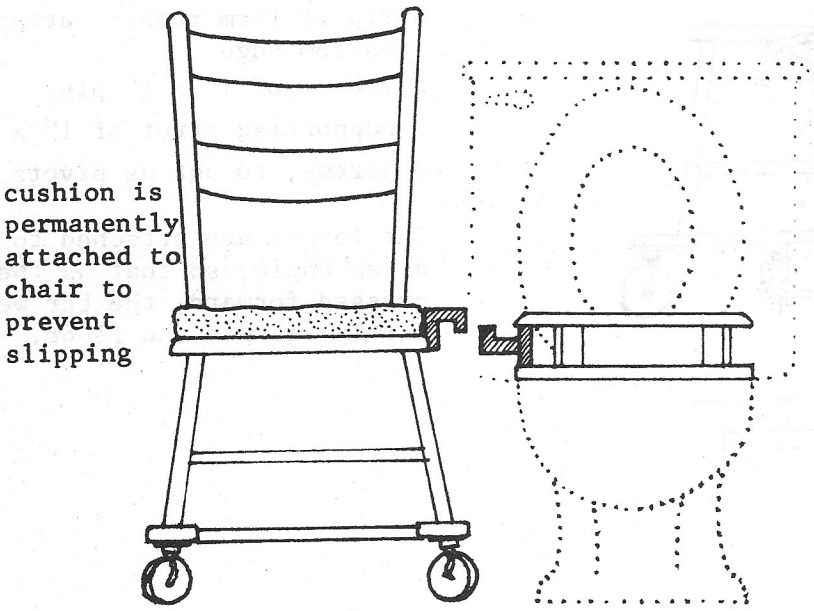




ANCHOR ATTACHMENTS
FOR CHAIR-ON-WHEELS

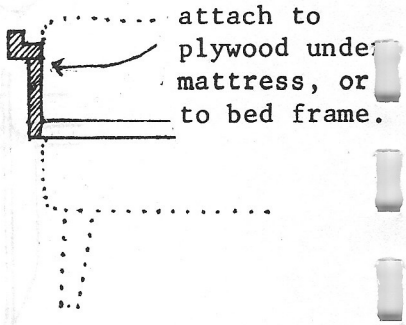
PURPOSE:

To allow a safe transfer when a person is confined to a chair; practical if only a mininum of furniture is used, as there must be an attachment for each piece.



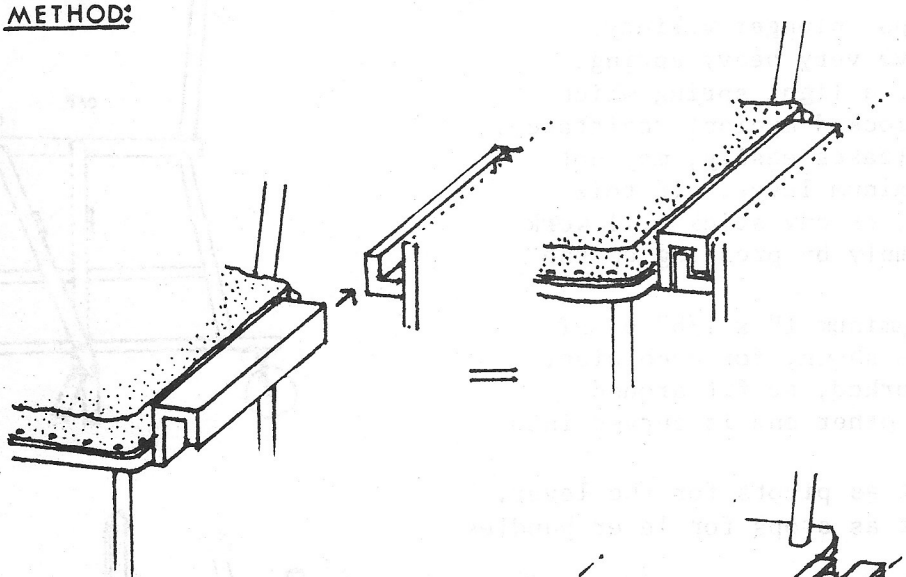
CHAIR-ON-WHEELS

RAISED TOILET SEAT

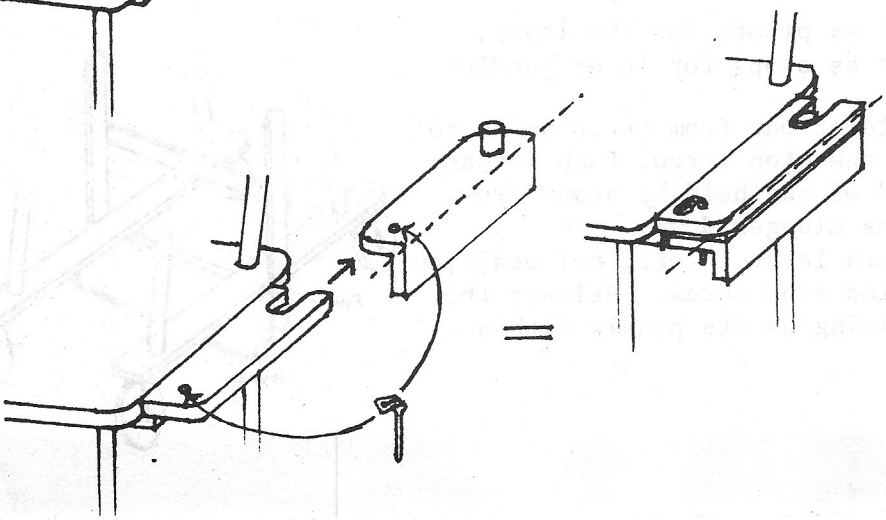


BED

METHOD:

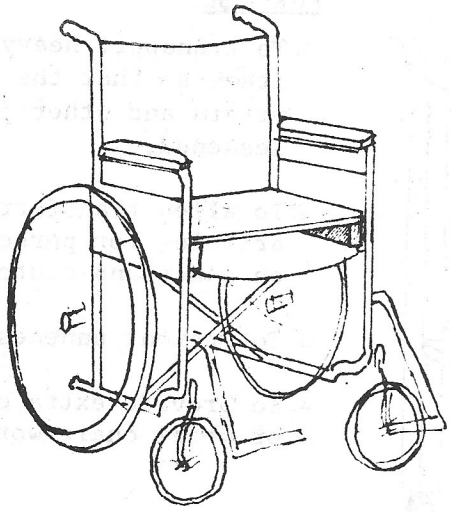


The chair slides back so that the two ledges fit into each other.



The chair slides back so that the notched extension fits onto the post. The two holes line up and are pinned together with a peg (e.g. dowel, with a leather tab for pulling it out).

WHEEL CHAIR RAISE



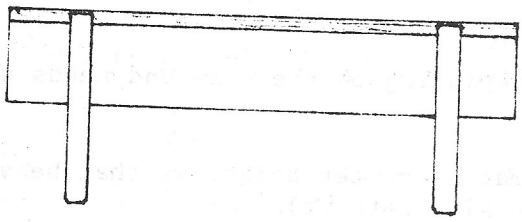
PURPOSE:

To facilitate raising when lower extremeties are weak or stiff, and to provide a firm, flat surface.

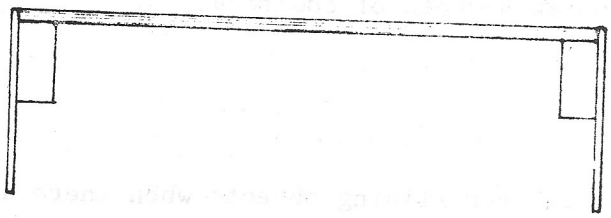
A cushion should be used on top for comfort.

If the raise is used for a tall person, the back and arms may need to be extended to give support.

Side

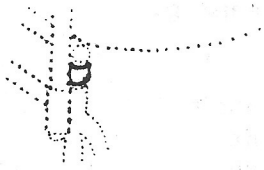


End



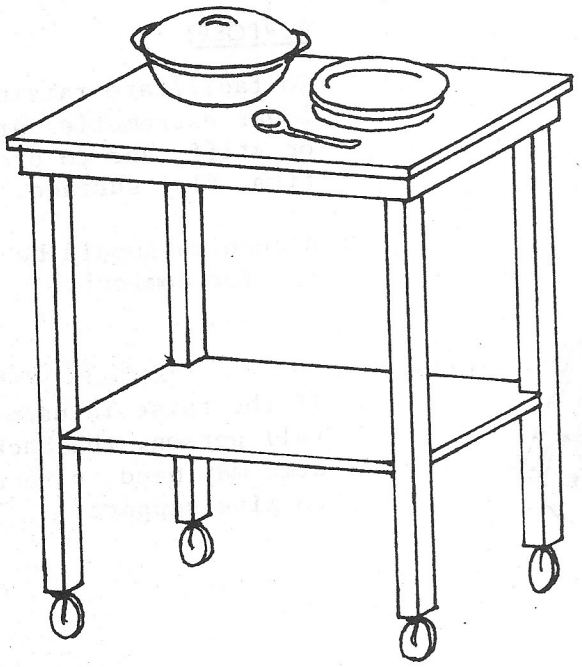
The raise needs to fit firmly on the edges of the seat, supported by the metal and not just the upholstery, to prevent wear.
To do this, aluminum (65 ST6, 1/8" x 1") struts may be fastened onto either side, if there is enough room for them.

This will also hold the sides of the chair in, so that one with removable arms doesn't jam when the weight is put on the seat sides rather than the middle.



Another way of preventing this is to put a ring of metal around the upright seat support which slides into the frame.

TABLE-ON-WHEELS



PURPOSE:

1. To transport heavy household items so that the strain on wrists and other joints is lessened.
2. To allow transferring of articles for persons dependent on canes and crutches.
3. To prevent unnecessary steps.
4. To provide extra counter space or wheel chair work table.

Measurements are variable, depending on the size and needs of the individual.

Sample size: 36" high (to match counter height so that heavy casseroles, etc can be slid onto it).

24" deep (to match depth of counter).

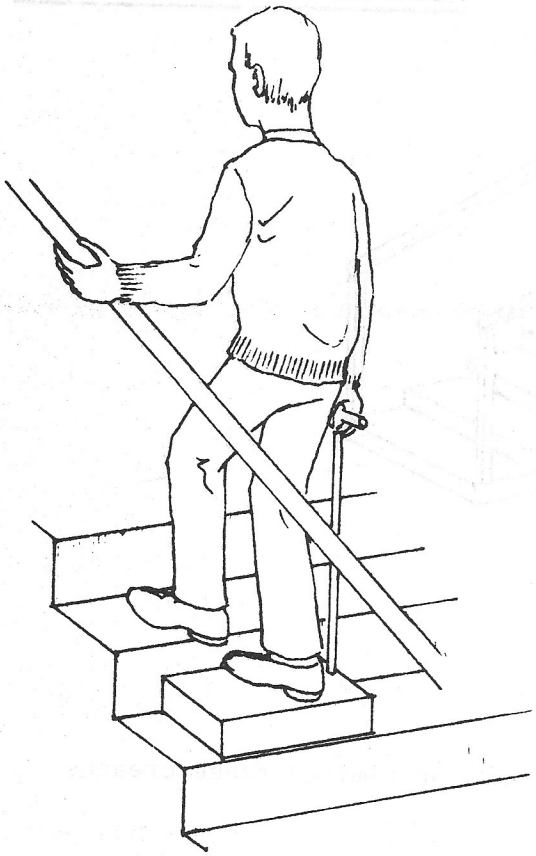
16" wide.

Features could include:

- Collapsible ramp for sliding objects when there are a variety of heights.
- Clip for anchoring canes or crutches
- Edging around several sides to prevent objects from slipping off.
- Indentation with handles at one end, to duplicate a walker.
- Formica top for easy cleaning.

MATERIALS: 2" x 2" wood for legs
½" plywood for top and shelf
1" x 3" for reinforcement
Set of 2½" swivel casters

PORTABLE HALF-STEP



PURPOSE:

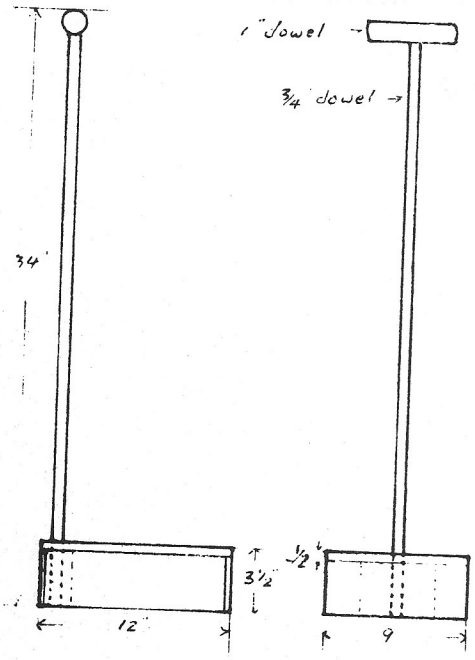
To lessen the height of a step rise, when range and strength are limited. Also may be used around the house when cupboard or appliances are too high.

The half-step should be used only in conjunction with a railing; if the handle is needed for support, it should be reinforced.

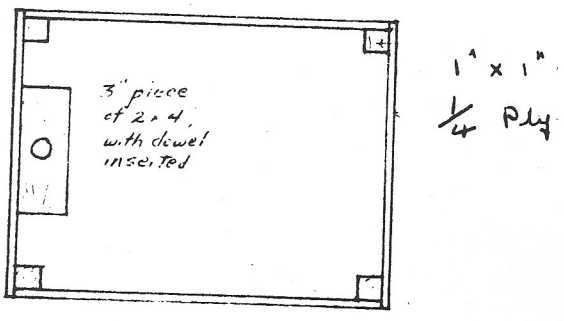
It should fit onto the step without overlapping it, and should be wide enough for both feet to stand on. Sample measurements are given.

The handle should be long enough for the user to reach when standing on the step above.

Rubber on the bottom edges will discourage slipping.

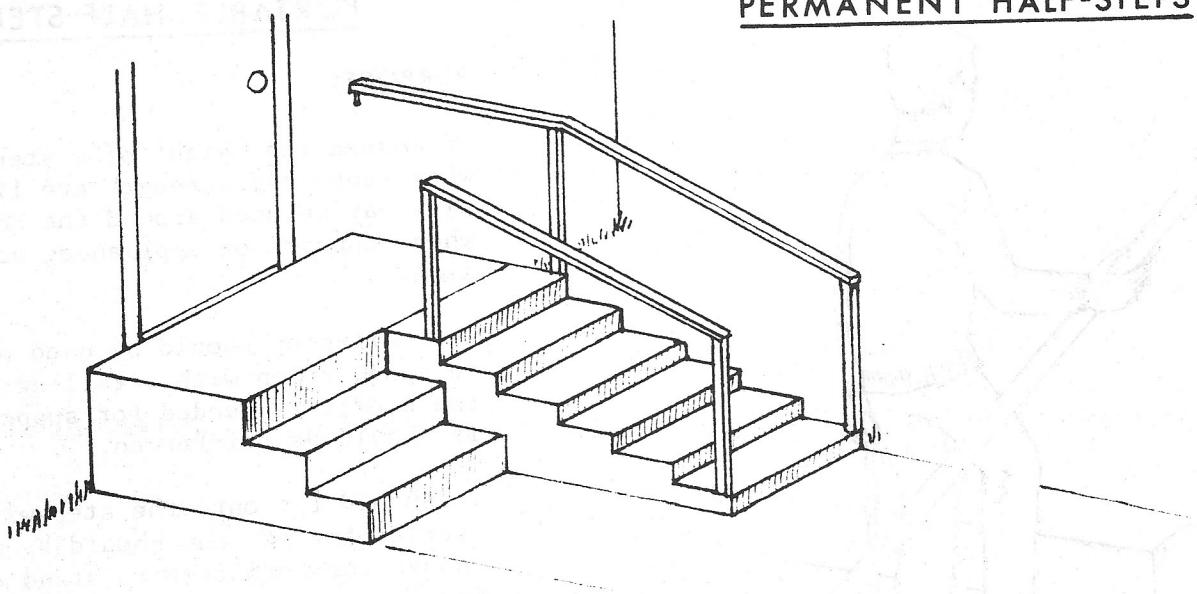


SIDE END



BOTTOM VIEW

PERMANENT HALF-STEPS



PURPOSE:

To decrease height of step when weakness, pain or limited range creates difficulty.

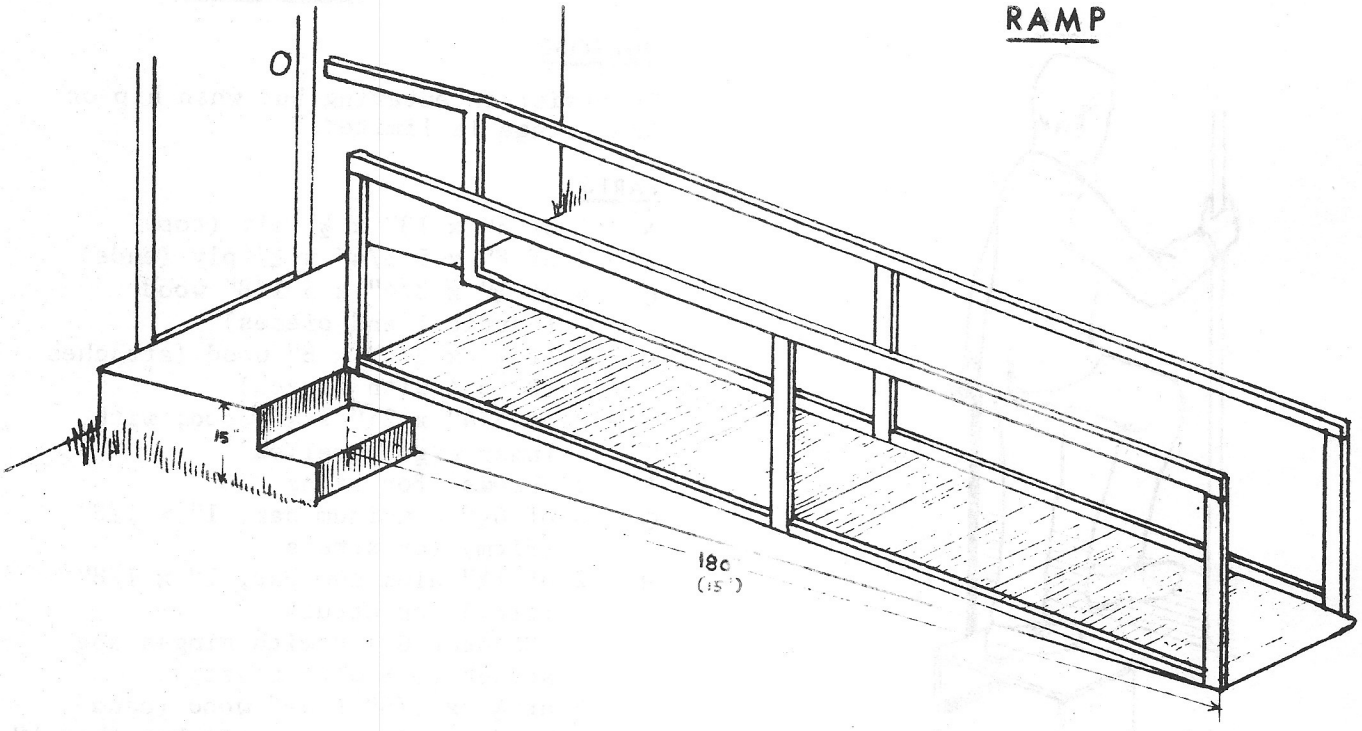
COMMENTS:

This is a major structural alteration, and with materials and labour, can be expensive.

It requires twice the length of the original steps plus one, if the height desired is half that of the original. The height depends on the patient's capabilities.

If space is limited, the staircase may be angled.

RAMP



PURPOSE:

To allow entry by wheelchair and to aid persons using canes and crutches.

CONSTRUCTION:

The grade should be 1 : 12, to permit independent use by persons in wheelchairs. This means a lengthy ramp.

e.g. 3 steps, each 8" high (i.e. 24" rise) would need 288" or 24'
6 steps, each 7" high (i.e. 42" rise) would need 504" or 42'

A carpenter should be consulted re construction details, as these will vary with the length needed.

COMMENTS:

1. There should be a railing on either side, 30" high, with the ramp at least 2' 7" wide.

2. There should be an edging along the base to prevent wheeling off.

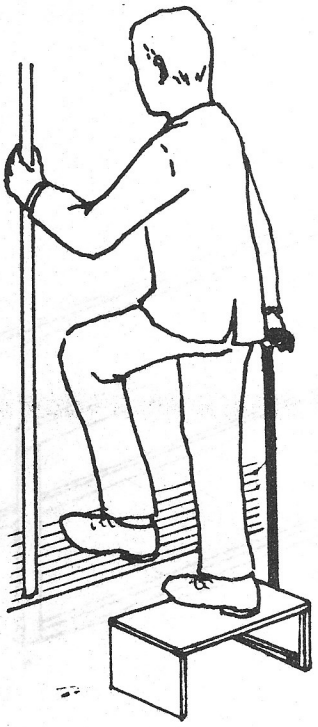
3. It should have a non-slip surface (i.e. non-skid paint or corrugated rubber with ribs going across, not down)

4. If space is limited, the ramp can have a bend in it; in this case there should be a 4' level area at the bend, for turning.

5. There should be a level platform at both top and bottom, at least 4' long. Also there should be a level platform at 10' or 15' intervals, if long, for resting.

COLLAPSIBLE BUS STEP

(For Cane Users)

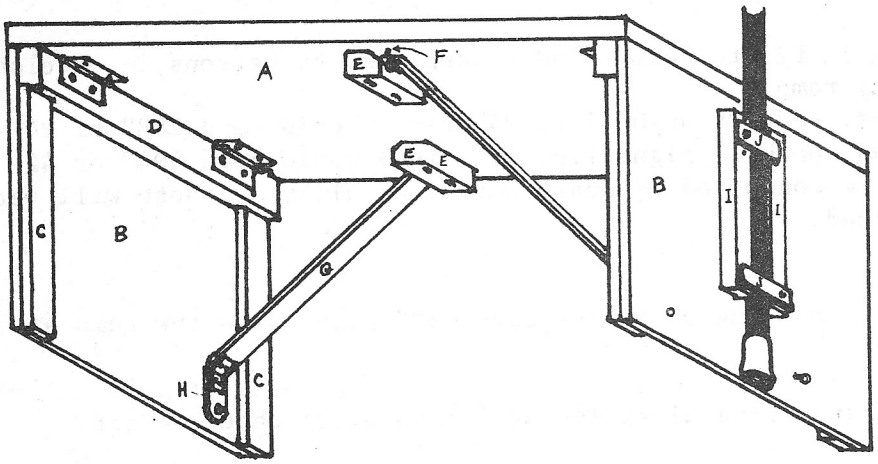


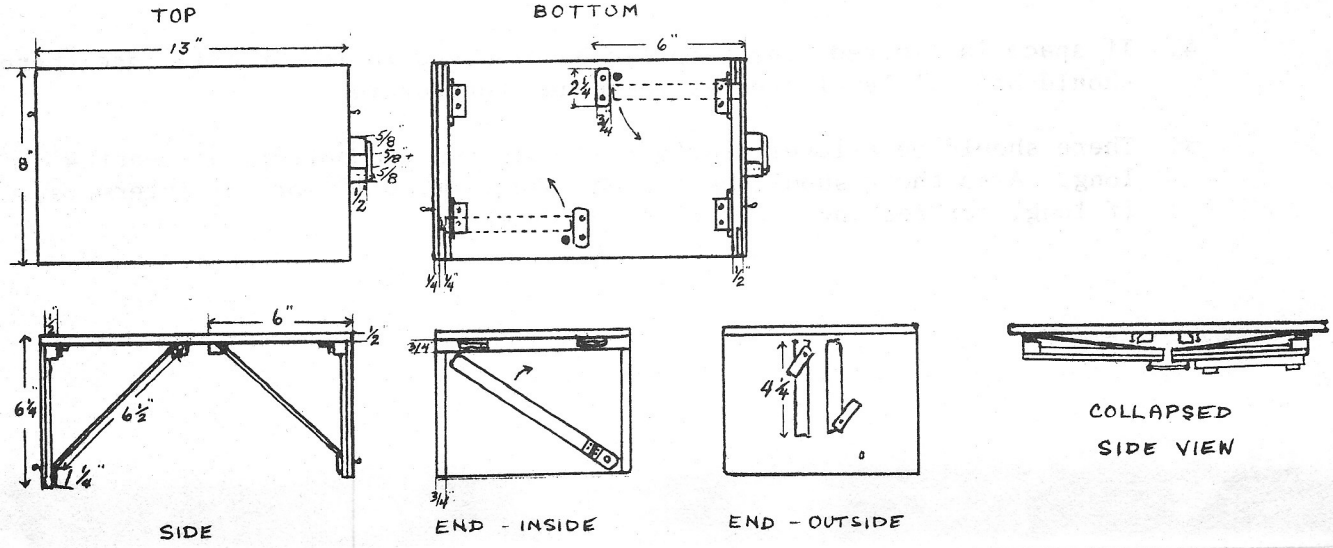
PURPOSE:

To assist in entering bus when hip or knee range is limited.

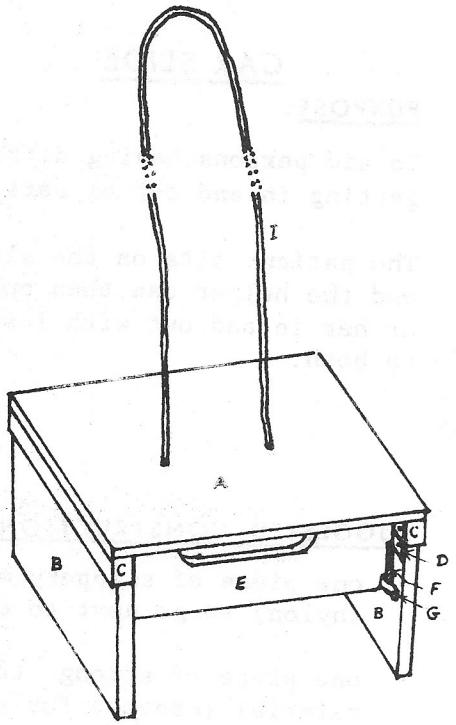
PARTS:

A - 1 of 8" x 13" x ½" ply (top)
B - 2 of 8" x 5 3/4" x ¼" ply (ends)
C - 4 of ¼" x 3/4" x 5 1/8" wood (vertical end pieces)
D - 2 of ½" x 3/4" x 8" wood (attaches (B to A with hinges)
E - 2 of 3/4" x 2¼" x ½" wood, with inner edge bevelled
F - 2 screws, for stops
G - 2 of 6½" aluminum bar, 1" x 1/8" (firm) for struts
H - 2 of 1¼" aluminum bar, 1" x 1/8" (firm) for struts (Connect G + H with hinges and attach to B with rivets)
I - 2 of ½" x 5/8" x 4¼" wood (cane holder; if cane is thicker than ½", use thicker wood)
J - 2 of 3/4" x 1½" x ½" wood (cane locks, which swivel on I)





COLLAPSIBLE BUS STEP
(Collapsible Handle)



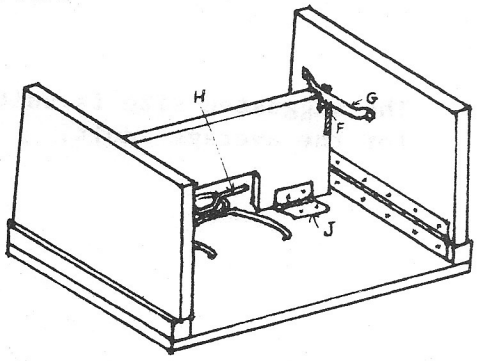
PURPOSE:

To provide a shallow step, to assist persons with limited leg range and strength to mount a high bus step

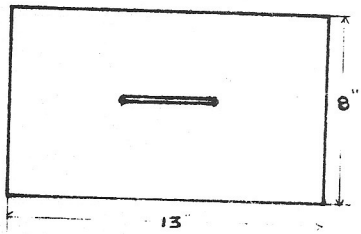
PARTS:

A. 1 of 8" x 13" x ½" ply (top).
B. 2 of 8" x 5½" x 5/8" ply (ends)
C. 2 of 8" x 7/8" x 3/4" (end of hinge attachments).
D. 2 of 8" of 3/4" piano hinge.
E. 1 of 4½" x 10½"–> 11 1/8" x ½" ply, shaped as shown (flap).
F. 2 of 1/8" x ½" x 2" aluminum bar, firm (tongue).
G. 2 of 1/8" x ½" x 5" aluminum bar, firm (slot).
H. 1 of 1/8" x ½" x 7" aluminum bar, firm (bracket for holding rope)
I. 6' of rope (e.g. clothesline) inserted through top, with ends knotted (handle).
J. 2 of 2" hinges.

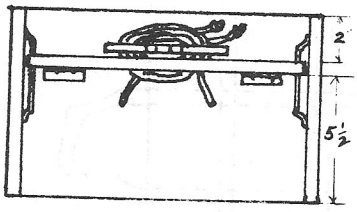
UNDERNEATH, UPSIDE-DOWN VIEW



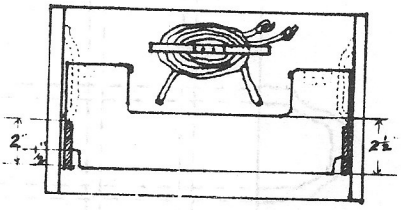
TOP

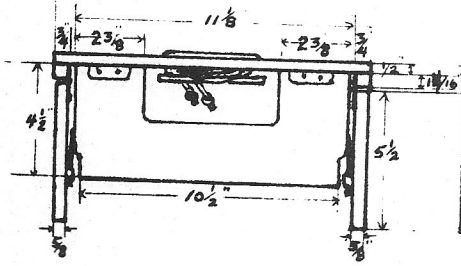


BOTTOM

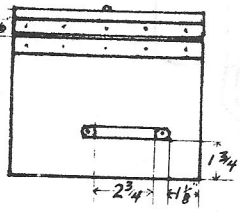


BOTTOM - FLAP COLLAPSED

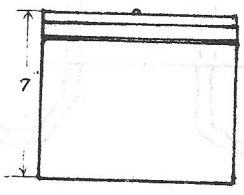




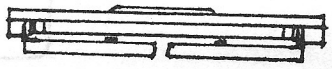
SIDE



END - INSIDE



END - OUTSIDE



COLLAPSED

CAR SLIDE

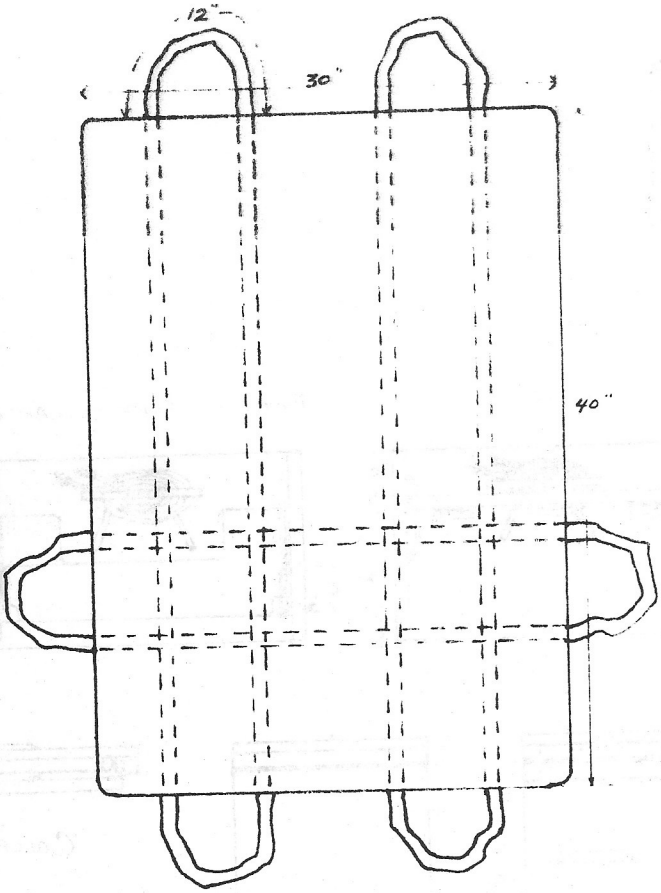
PURPOSE:

To aid persons having difficulty getting in and out of cars.

The patient sits on the slide, and the helper can then pull him or her in and out with less strain to both.

SUGGESTED CONSTRUCTION:

- one piece of slippery material (nylon) to go next to car seat.
- one piece of strong, textured material (canvas) for strength.
- doubled strips of canvas or tape, sewn inside the two materials; these provide reinforcement and loops for handles.



The suggested size is suitable for the average adult.

SLIDING BOARD

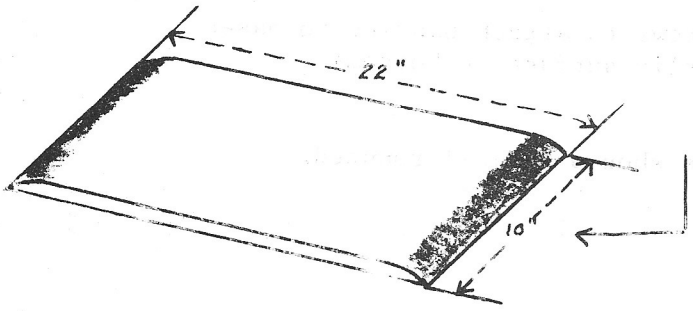
PURPOSE:

To assist transferring from one surface to another when weight-bearing is not advised or is limited by weakness.

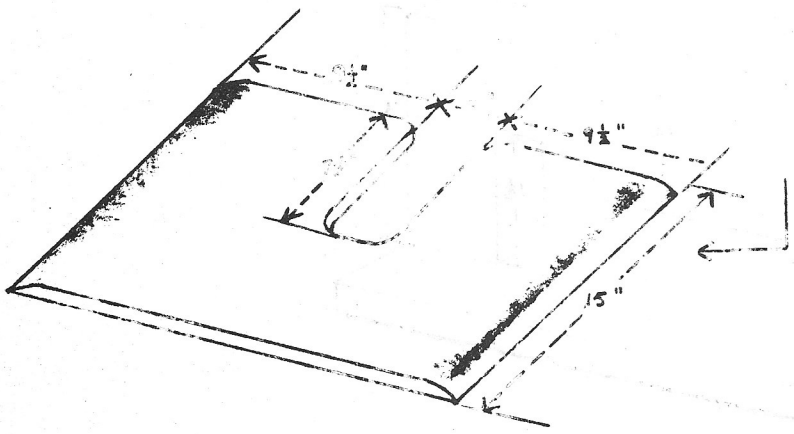
Surface must be very smooth, and ends bevelled gradually.

Where skin is fragile, thin foam rubber covered with nylon may be put on top.

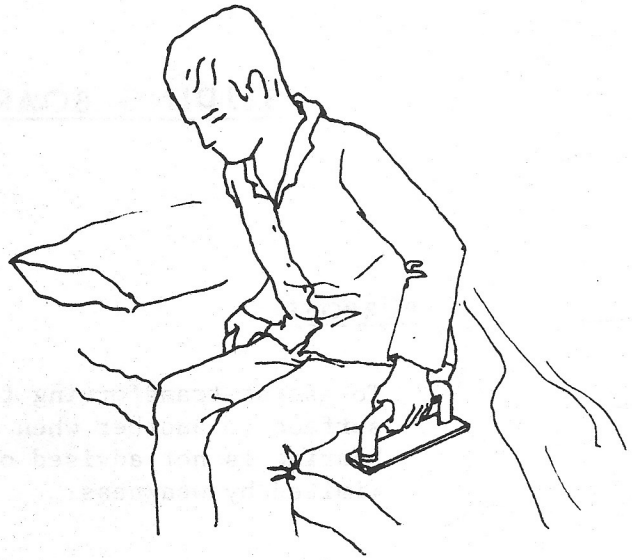
Chair may be anchored to bed by hook; board may have extensions which hook onto bed also.



Size of board depends on weight of person and length of transfer. Sample measurements are given, using ½" plywood.



If used with wheelchair, a notch may be cut out to fit over chair.



PUSH-OFF HANDLES

PURPOSE:

To facilitate rising when wrist extension is limited or when m.c.p. joints are needing protection.

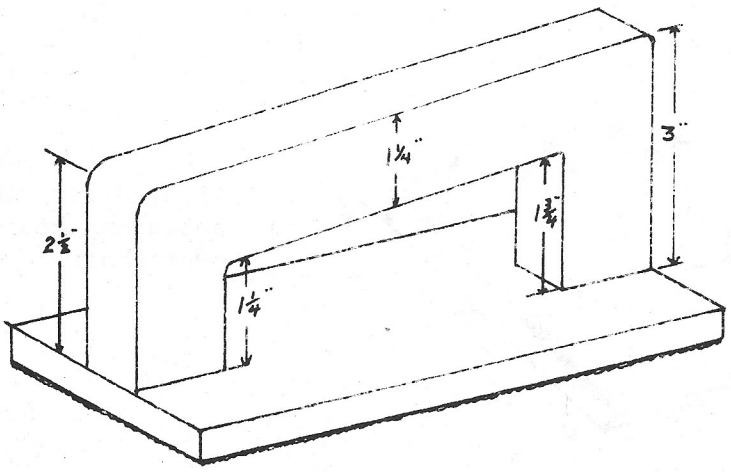
MATERIALS:

A - 2 platforms; 6½" x 3" x ½" plywood

B - 2 handles; 6½" x 2½" → 3" x 3/4" plywood

4 screws to attach handles to bases
non-slip surface on bottoms

Edges should be well rounded.



PART III - NOTES